CATALOGO DE PRODUCTOS

Instrumental Biomédico

2008

ETYC S.A.
C1083AAD- Ciudad de Buenos Aires
Argentina
TE / Fax: 54-11-4932-6620 Líneas Rotativas
E-mail: **etyc@grupo-dyne.com**
etyc@infovia.com.ar
Web: **www.etyc.com.ar**

TABLA DE CONTENIDOS

Analizador de Desfibriladores/Marcapasos Impulse 6000D/7000DP	3
Analizador de Desfibriladores/Marcapasos QED 6	6
Analizador de Marcapasos Transitorios SigmaPace™ 1000	7
Analizador de Electrobisturí QA-ES	9
Analizador de Electrobisturí $RF303_{RS}$	11
Analizador de Bombas de Infusión Multicanal IDA 4 PLUS	13
Analizador de Seguridad Eléctrica ESA620	15
Analizador de Seguridad Eléctrica ESA601	17
Analizador de Seguridad Eléctrica 601 Pro Series $_{XL}$	19
Analizador de Seguridad Eléctrica 180	21
Analizador de Seguridad Eléctrica 175	22
Tester de Corriente de Fuga de Transductores de Ultrasonido ULT800	23
Simulador de Presión Sanguínea No Invasiva BP Pump 2	24
Simulador de Presión Sanguínea No Invasiva CuffLink	25
Simulador Multiparámetro MPS 450	27
Simulador Multiparámetro medSim 300B	29
Simulador Multiparámetro PS420	31
Simulador Multiparámetro PS415	34
Simulador de ECG/Arritmias PS410	35
Simulador de ECG/Arritmias PS400	36
Simulador Multiparámetro DataSim6100	37
Hand Held Controller	38
Simulador Fetal PS 320	39
Simulador de Oximetría de Pulso Index 2_{XL}	41
Pulmón de Prueba AccuLung	42
Analizador de Respiradores VT MOBILE	43
Analizador de Respiradores VT PLUS HF	45
Tester de Presión/Flujo/Temperatura DPM4	47
Tester de Transductores Neumáticos DPM1 B	49
Medidor de Presión DPM2PLUS	50
Test Automation Software Ansur	51
Analizador de Incubadoras INCU™	52
Analizador de Concentración de Oxígeno $MaxO_2$ PLUS AE	53

Impulse 6000D/7000DP

Defibrillator/Transcutaneous Pacemaker Analyzer

FLUKE® Biomedical

N10140

The Impulse 6000D Defibrillator Analyzer and Impulse 7000DP Defibrillator/Transcutaneous Pacemaker Analyzer Test Systems are rugged, portable precision test instruments that ensure proper operation and ultimate performance of critical life-support cardiac-resuscitation equipment. The Impulse 6000D and Impulse 7000DP test capabilities encompass the spectrum of worldwide-established pulse shapes, showcase breakthrough AED technology compatibility, and outperform in accuracy and standards. Additionally, the Impulse 7000DP incorporates the tests and the extensive range of test loads and measurement algorithms needed to test external transcutaneous pacemakers.

A standard USB interface enables computer control and data transfer, and optional Ansur PC-based automation software increases productivity by outfitting users with an easy-to-use method to standardize testing procedures and capture, print and document data.

Key features

- Lown, Edmark, trapezoidal, biphasic and pulsed biphasic defibrillation technology compatibility
- AED technology compatibility
- First-class measurement accuracy: ± 1 % of reading 0.1 J
- Intuitive user interface and backlight, easy-to-ready display
- Portable, rugged, easy to carry
- Long-lasting, rechargeable battery
- Internal pacer brand selections
- Pacer input protected against defibrillator output (7000DP only)
- 10 isolated ECG electrodes that provide 12 combinations for standardized clinical signals
- Flexible heart-rate settings (1 BPM step) facilitate rate meter accuracy and alarm testing
- DSP-based measurements enable future firmware and waveforms upgrade
- Unique integrated posts for secure connections
- Optional Ansur test automation software to standardize testing procedures, capture waveforms, and print and document test result

Specifications

Defibrillator Analyzer

Energy output measurement	Compatible defibrillator waveshapes: Lown, Edmark, trapezoidal, dc bi-phasic, and ac pulsed bi-phasic
Autoranged measurement	0.1 J to 600 J
Accuracy	0.1 J to 360 J: ± 1 % of reading +0.1 J 360 J to 600 J: ± 1 % of reading +0.1 J, typical Note: For pulsed bi-phasic defibrillator, specified accuracy is ± (1.5 % of reading + 0.3 J) on both ranges

Product comparison chart

Model	QED 6	Impulse 6000D	Impulse 7000DP
Monophasic and dc biphasic energy capability	Yes	Yes	Yes
Pulsed biphasic engery capability	No	Yes	Yes
Defibrillator tests	Output energy	Output energy	Output energy
	Cardioversion	Cardioversion	Cardioversion
	Peak measurements	Max energy/charge-time overshoot	Max energy/charge-time overshoot
	–	Peak and average current	Peak and average current
	–	Voltage measurement	Voltage measurement
Normal ECG/performance waves	No	Yes	Yes
Transcutaneous pacer tests	No	No	Yes

Impulse 6000D/7000DP

Defibrillator/Transcutaneous Pacemaker Analyzer

FLUKE® Biomedical

Specifications

Defibrillator Analyzer (continued)

Load resistance	Resistence: 50 Ω
Accuracy	1 %, non-inductive (< 2 µH)
Charge time measurement	Range: 0.1 s to 100 s
	Accuracy: ± 0.05 s, typical
Synchronization test (cardioversion)	**Delay time measurement**
	• Timing window: ECG R-wave peak to the defib pulse peak • Range: -120 ms to 380 ms; measures timing from 120 ms prior to the R-wave peak to up to 380 ms following the R-wave peak
	Automated defibrillator test ECG waves
	• Normal sinus: 10 BPM to 300 BPM in 1 BPM steps • Ventricular fibrilation: Coarse and fine • Monomorphic ventricular tachycardia: 120 BPM to 300 BPM in 1 BPM steps • Polymorphic ventricular tachycardia: 5 types • Asystole
ECG waves	
ECG general	Lead configuration: 12-lead simulation; RA, LL, LA, RL, V1-6 with independent outputs
Lead to lead impedance	1000 Ω
Rate accuracy	± 1 % nominal
ECG amplitudes	Reference lead: Lead 1
	Settings: 0.05 mV to 0.45 mV by 0.05 mV and 0.5 mV to 5 mV by 0.05 mV
	Accuracy: ± 2 % of setting, Lead I and 2 Hz square wave
ECG normal sinus	Rates: 10 BPM to 360 BPM in 1 BPM steps
ECG on defibrillator input load	60 % of Lead I amplitude, max 3.5 mV
ECG performance waves	Square wave: 2 Hz and 0.125 Hz
	Triangular wave: 2 Hz and 2.5 Hz
	Sine waves: 0.05 Hz, 0.5 Hz, 5 Hz, 10 Hz, 40 Hz, 50 Hz, 60 Hz, 100 Hz, 150 Hz, and 200 Hz
	Pulse: 30 BPM and 60 BPM, 60 ms pulse width
R-wave detection	Waveform: Haver-triangle
	Rate: 30 BPM, 60 BPM, 80 BPM, 120 BPM, 200 BPM, and 250 BPM
	Widths: 8 ms, 10 ms, 12 ms, and 20 ms to 200 ms in 10 ms steps
	Accuracy: ± 1 % setting 0.2 mV
Noise immunity	Wave sine
	Line frequency: 50 Hz or 60 Hz (± 0.5 Hz)
	Amplitude: 0 mV to 10 mV (by 0.5 mV ± 5 %)
Arrhythmia selections	Pacer interactive (Impulse 7000DP only) Supraventricular Premature Ventricular Conduction Transveneous paced with selectable pacer spike amplitudes and widths

Impulse 6000D/7000DP

Defibrillator/Transcutaneous Pacemaker Analyzer

FLUKE® Biomedical

Specifications

Transcutaneous Pacemaker Analyzer (Impulse 7000DP only)

Defibrillator input	Fixed load: 50 Ω Accuracy: ± 1 %, non-inductive (< 2 µH)
Pacemaker input	Variable load: 50 Ω to 1500 Ω by 50 Ω Accuracy: ± 1 %, non-inductive (< 2 µH)
Manufacturer specific algorithms	• Medtronic/Physio Control LIFEPAK • Philips/Agilent/HP • ZOLL Medical • GE Responder (1500 and 1700) • MRL/Welch Allyn • Schiller Medical • MDE300 (Medical Data Electronics, plus a general purpose default algorithm selection)
Current	Range: 4 mA to 250 mA Accuracy: ± 1 % of reading +0.02 mA
Pulse rate	Range: 5 PPM to 800 PPM Accuracy: ± 0.5 % of reading +0.1 PPM
Pulse width	Range: 1 ms to 100 ms Accuracy: ± 0.5 % of reading +0.01 ms
Demand and asynchronous mode test	Underdrive rate: 10 BPM minimum Overdrive rate: 300 BPM maximum
Sensitivity test	**Automatic interactive threshold detection**
	Compatible pacer rates: 30 PPM to 120 PPM
	ECG R wave
	Waveforms: Square, triangle, sine
	Widths: 1 ms to 19 ms (by 1 ms), 20 ms to 95 ms (by 5 ms), 100 ms to 300 ms (by 25 ms)
	Accuracy: ± 5 % of setting
	Amplitude: 0.05 mV to 0.95 mV (by 0.05 mV), 1 mV to 5 mV (by 0.5 mV)
	Accuracy: ± 5 % of setting
Refractory period tests	Paced refractory period 20 ms to 500 ms Sensed refractory period 15 ms to 500 ms Accuracy: ± 1 ms

General information	
Dimensions (LxWxH)	32 cm x 24 cm x 13 cm (13 in x 9.5 in x 5 in)
Weight	3.02 kg (6.6 lb)

Standards	
Safety standards	CE: IEC/EN61010-1 2nd Edition; Pollution degree 2; CSA: CAN/CSA-C22.2 NO,61010-1, UL61010-1; C-Tick: Australian EMC

Optional accessories

3091370 Ansur Impulse 6000D/7000DP Plug-In

3065489 MedtronicERS/Physio-Control (FAST PATCH) (set of two): 4 mm defibrillator adapters

3065450 Kimberly Clark/R2 Darox MRL/MDE/NK: 4 mm defibrillator adapters

3065438 Internal discharge paddle contacts (set of two)

3065477 Medtronic ERS/Physio-Control (QUIK PACE) (set of two): 4 mm pacer adapters

3065527 Zoll Medical NTP/PD1400: 4 mm pacer adapters

3065461 Medtronic ERS/Physio-Control (QUIK COMBO): 4 mm defib/pacer adapters

3065492 Philips/Agilent/HP (CODEMASTER Series-Round): 4 mm defib/pacer adapters

3065509 Philips/Agilent HEARTSTART FR2/MRX: 4 mm defib/pacer adapters

3065511 Zoll PD-2200 Multi-Function PD-Series, M-Series, M-Series CCT, AED PRO® and AED Plus™ defib/pacer adapters

3065423 GE Marquette (RESPONDER 1500/1700 Series) (set of two): 4 mm defib/pacer adapters

Included accessories

3028681 User Manual CD

3028662 Getting Started Guide

Battery Eliminator (country specific)

2814980 Carrying Case

2795773 Defibrillator Paddle Contact Plates

Ordering information

2811928 Impulse 6000D Defibrillator Analyzer US 120 V

3077031 Impulse 6000D-01 Defibrillator Analyzer Schuko

3077046 Impulse 6000D-02 Defibrillator Analyzer UK

3077054 Impulse 6000D-03 Defibrillator Analyzer Japan

2811919 Impulse 7000DP Defibrillator/Transcutaneous Pacemaker Analyzer US 120 V

3077005 Impulse 7000DP-01 Defibrillator/Transcutaneous Pacemaker Analyzer Schuko

3077010 Impulse 7000DP-02 Defibrillator/Transcutaneous Pacemaker Analyzer UK

3077022 Impulse 7000DP-03 Defibrillator/Transcutaneous Pacemaker Analyzer Japan

FLUKE®
Biomedical

QED 6

Defibrillator Analyzer

The Defibrillator Analyzer, QED 6, measures delivered energy in watt seconds/joules (with a simulated human resistance of 50 Ω), synchronization time in milliseconds (measured and displayed from Q- or R-Wave), and peak measurements (current, voltage). The QED 6 is an excellent choice when it comes to testing newer defibrillators that utilize biphasic output waveforms.

Key features

- Energy measurement 0 J to 100 J and 0 J to 360 J
- Cardioversion sync time
- Defibrillator waveform storage and playback
- Oscilloscope output
- Auto and manual modes
- Automated External Defibrillator (AED) compatible
- Compatible with DC biphasic defibrillators
- RS-232 port
- Serial printer output

Specifications

Output energy	Load: 50 Ω
	Energy: 0 J to 1000 J
	Current: 110 A
	Voltage: 5500 V
	Pulse width: 1 ms to 50 ms
	Maximum current: 35 A (low), 110 A (high)
Sync time	0 ms to 199.9 ms (measurement from peak or base of simulated R-Wave
Scope output	ECG high level: Fixed at 1 V
	Pacer/defib: Real time
RS-232 port	Bidirectional RS-232 for computer control and printing
Display	2-line x 24-character LCD
Power	One 9 V dc alkaline battery
	120 V ac battery eliminator
	220 V ac battery eliminator
Dimensions (WxDxH)	24.1 cm x 26.7 cm x 10.2 cm (9.5 in x 10.5 in x 5 in)
Weight	2.2 kg (4.8 lb)

Optional accessories

2817226 Ansur QED 6 Plug-in
2204282 Carrying Case
2204472 RS-232/Printer Cable
2248899 Serial/Parallel Printer
2720054 9 V dc Adapter

Included accessories

2204510 Operator's Manual
2204198 Internal Paddle Adapters

Ordering information

2251457 QED 6 Defibrillator Analyzer

SigmaPace™ 1000

External Pacemaker Analyzer

FLUKE ®
Biomedical

Fluke Biomedical's premier SigmaPace 1000 analyzes both transvenous and transcutaneous external pacemakers and comes loaded with features to save time and money. This powerful hand-held tool conducts the full suite of tests specified by major pacemaker manufacturers in less than half the time it would take using originally prescribed testing methods.

Output data is displayed on three selectable screens for easy viewing, including an AV delay time readout providing a performance snapshot for both pacer channels.

With capability for long-term trend testing, the SigmaPace 1000 can interrogate a pacer for up to 11 days, capturing data pulse by pulse to detect intermittent and hard-to-find problems.

For maximum efficiency, the SigmaPace 1000 doubles as a training tool. Interactive ECG simulation lets users test patient monitoring equipment as well as teach nurses how to operate the pacemaker.

Key features

- Transcutaneous and transvenous external pacemaker tests
- Pulse-output tests (rate, current, volts, energy, pulse width, and AV interval)
- Amplitude sensitivity and refractory tests
- Demand and asynchronous-mode tests
- DC load current test
- Output-leakage tests
- Line-frequency noise-rejection tests
- Wide range of test loads, from 50 Ω to 1500 Ω, specified by manufacturer for transcutaneous pacers
- Full range of IEC specified test loads for transvenous pacers 200 Ω, 500 Ω, and 1000 Ω
- Pacer output displayed on three different screens
- AV readout showing both pacer channels on one screen
- Long-term trend test to detect intermittent errors and hard-to-find problems
- Interactive ECG pacer simulation with 5-lead output for patient monitor evaluation and pacer operation training
- 8-line x 21-character display

Specifications

ECG disposable snap electrode adapters	3.2 mm and 4 mm
Modes of operation	Manual, remote
Transcutaneous pacer tests	**Pulse output test** Current: 4 mA to 250 mA Rate: 5 PPM to 300 PPM Width: 1 ms to 99.9 ms Energy: 1 µJ to 1.99J
	Demand model test
	Async mode test
	Amplitude sensitivity test
	Noise immunity test
	Paced refractory period test
	Sensed refractory period test
	Internal test loads: 31 selections: 50 Ω to 1550 Ω

SigmaPace 1000 standard accessories

SigmaPace™ 1000

External Pacemaker Analyzer

FLUKE® Biomedical

Specifications

Transvenous pacer tests	**Pulse output test** Display output test: (3) single (A or V) and dual (A+V) Current: 0.05 mA to 30 mA Rate: 10 PPM to 999 PPM Width: 0.02 ms to 9.99 ms Voltage: 0.05 V peak to 30 V peak Energy: 1 nJ to 999 µJ
	Demand model test
	Async mode test
	Amplitude sensitivity test
	Noise immunity test
	Paced refractory period test
	Sensed refractory period test
	AV delay time test
	DC leakage current test
	Measurement of dc offset on the pacemaker output
	Test types: Static/continuous and dynamic/sync'd with output
	Inputs/test loads: (3) 500 Ω
	DC current range: 0.1 mA to 99.9 mA
	Battery load current test Load current drawn by the pacemaker: 99.9 mA max
Transvenous measurement algorithm	Default: Derived from device manufacturer(s)
Available internal test loads	Ventricular and atrial channels: 200 Ω, 500 Ω, and 1000 Ω
	Default selection: 500 Ω (both A and V channels)
Long-term trend test	Tests the fundamental stability of the pacer output Total pulse count: 999,999 (max) Elapsed time: 999:59:59 (max) Maximum error count: 200 pulses Test limits: Selectable rate and output percentages
Interactive pacer ECG simulation	Simulates dynamic patient ECG activity in response to pacer output: Interactive NSR heart rate: 0 BPM to 25 BPM NSR PR interval: 0.05 s to 0.399 s Transvenous threshold: 1 mA to 25 mA Transcutaneous threshold: 10 mA to 250 mA
Serial port	Type: RS-232 Baud rate: 2400, 9600, and 192000
Power	Internal lithium ion battery pack (rechargeable) Battery operation: 20 hours (minute) Universal/external ac-to-dc power supply
Dimensions (WxDxH)	10.1 cm 20.3 cm x 5 cm (4 in x 8 in x 2 in)
Weight	0.9 kg (2 lb)

Optional accessories

2245006 Electrode adapters (including the brand/model-specific interface connector and a pair of 4 mm "safety-type" banana plugs)
2201109 Aligent (HP) CodeMaster Series
2201111 GE Marquette Medical
2201127 Medical Data Electronics (MDE); Medical Research Laboratories (MRL)
2201095 Medtronic Physio-Control Quick Combo
2201088 Medtronic Physio-Control Quick Pace
2201323 Philips/Agilent Codemaster Series
2201130 Zoll Medical NTP Series
2201148 Zoll Medical PD Series and M Series
2200102 Interface Cable (RS-232; female DB9 to female DB25; medTester to SigmaPace™ 1000/PC/Index 2XL/IDA 4 Plus; Impulse 4000 to PC)
2201419 Detachable cord set—Japan (IEC 320 C6 type 3-pin inlet)
2201437 Detachable cord set—Schuko—Euro (IEC 320 C6 type 3-pin inlet)
2201428 Detachable cord set—UKI (IEC 320 C6 type 3-pin inlet)
2201455 Detachable cord set—USA (IEC 320 C6 type 3-pin inlet)
2201443 Detachable cord set—Australia (IEC 320 C6 type 3-pin inlet)

Included accessories

2243306 Usep Manual
2392906 Soft-sided Vinyl Carrying Case
2201166 Transvenous Pacer Test Leads (2 sets, red)
2201153 Transvenous Pacer Test Leads (2 sets, black)
2392272 SigmaPace 9 V dc Load Test Cable
2392260 Serial PC Interface Cable
2184298 Universal-input Battery Charger
2198724 Power cord set USA 120 V ac

Ordering information

224770 SigmaPace 1000 – USA, 120 V
2394548 SigmaPace 1000 – Japan, 100 V
2394553 SigmaPace 1000 – Schuko, 250 V
2394566 SigmaPace 1000 – UK, 250 V

QA-ES Series II

Electrosurgery Analyzer

FLUKE® Biomedical

QA-ES Series II analyzes electrosurgical units quickly and accurately.

A wide load-resistance range provides 128 user-selectable loads, including very low loads for testing many of today's ESUs.

An accuracy of ± 2 % of reading down to 20 mA guarantees reliable high-frequency leakage results. With capability to run an automatic-power-distribution test in as little as 1 minute, the QA-ES works fast so technicians save time.

An Ansur QA-ES software plug-in allows users to create and automatically run tests, capture data, and produce easy-to-read reports with a PC.

Key features

- Automatic power distribution measurement, including power, current, peak-to-peak voltage (closed load only), and crest factor
- Oscilloscope output
- High-frequency leakage measurements with accuracy of ± 2 % of reading
- 128 internal user-selectable test loads from 10 Ω to 5200 Ω
- Foot-switch output for triggering the ESU under test
- Ansur QA-ES software plug-in for automated test protocols
- Large display
- RS-232 and Centronic-Printer interface

Specifications

Generator output	
Continuous operation	Continuous measurement of power, current, peak-to-peak voltage (closed load only), and crest factor
Single operation	Single measurement after the set delay time of the ESU output of power, current, peak-to-peak voltage (closed load only), and crest factor
Power distribution	Automatic measurement of power, current, peak-to-peak voltage (closed load only), and crest factor through a user-selectable load range
RF leakage current	Provides connections and load configurations to measure HF leakage from both grounded and isolated equipment
RECQM	Test the "return electrode control quality monitoring" using the QA-ES internal loads.

Product comparison chart

Model	$RF303_{RS}$	QA-ES Series II
Test leads	50 Ω to 750 Ω in step of 50 Ω	10 Ω to 2500 Ω in step of 25 Ω (@ dc), 2500 Ω to 5200 Ω in step of 100 Ω (@ dc)
Displayed-result parameters	W, mA, Ω	W, mA, Ω
High-frequency leakage current	30 mA to 2500 mA RMS	20 mA to 2200 mA ± 2 % of reading
	Accuracy: ± 2.5 % or reading or ± 15 mA, whichever is greater	–
Automation capabilities	medTester 5000C	Ansur
Additional benefits	Battery operated	Foot-switch output for triggering the ESU under test

QA-ES Series II

Electrosurgery Analyzer

FLUKE® Biomedical

Specifications

Generator output (continued)	
Modes of operation	Manual or remote controlled (via Ansur)
Measurement	True-rms value of applied waveform
RMS bandwidth	30 Hz to 10 MHz (-3 dB) for instrumentation only 30 Hz to 2.5 MHz (-3 dB) with loads
Low frequency filter	100 Hz filter to avoid low-frequency disturbance or interference
Current	20 mA to 2200 mA
Current accuracy	20 mA to 2200 mA ± 2 % of reading
Load resistance	10 Ω to 2500 Ω in step of 25 Ω (@ dc) 2500 Ω to 5200 Ω in step of 100 Ω (@ dc)
Additional fixed load	200 Ω 400 W for 30 s; max 15 % duty cycle
Crest factor	The higher of the two peak voltage measurements is used for computation Range: 1.4 to 16 (V peak/V rms).
Foot-switch output	The foot switch output can be used to trigger the electrosurgical unit.
Peak-to-peak voltage	0 kV to 10 kV (closed load only) accuracy: ± 10 % **Note**: Measurement is taken between the active and dispersive electrodes with closed load only.
Oscilloscope output	5 V/A uncalibrated, 100 mA RF current minimum input
Ansur QA-ES plug-In remote control	All functions and tests in QA-ES may be performed from the PC
	User-programmable test sequences
	Allows unlimited numbers of test sequences with user-programmable templates and test limits. These tests include power distribution test, output test, HF leakage, and RECQM verification.
Storage and recall	Protocol formats and data may be stored, recalled, printed out, or transferred.
Temperature	
Operating	15 °C to 35 °C (50 °F to 95 °F)
Storage	0 °C to 50 °C (32 °F to 122 °F)
General information	
Display	LCD graphic display Alphanumeric format 8 lines x 40 characters Graphic mode 240 x 64 pixel matrix
Display control	Five f-keys, enter, cancel, control knob, and an encoder
Data input/outputs	Parallel printer port and bidirectional RS-232
Power	115/230 V ac; 48 Hz to 66 Hz, 35 VA
Housing	Metal case
Dimensions (LxWxH)	39.5 cm x 34.2 cm x 13.2 cm (15.6 in x 13.5 in x 5.2 in)
Weight	9.8 kg (21.6 lb)

Optional accessories

2461794 Carrying Case
2461802 Ansur Test Software, QA-ES plug-in license
2461993 Data Transfer Cable, RS-232
2716059 QA-ES II Calibration Manual
2523266 Clamp, crocodile style, grip C, black
2523275 Clamp, crocodile style, grip C, red

Included accessories

2716044 QA-ES Series II User Manual (electronic, CD)
2716032 QA-ES Series II User Manual (printed)
2772171 ESU-Dispersive Safety Lead
2772180 ESU-CQM Safety Lead
2772209 ESU-Jumper Safety Lead
2826194 Test Lead with stackable plugs
1903307 Test Lead Set with retractable sheaths
1610159 Sure-Grip Large Alligator Clip Set
Power Cord (country specific)

Ordering information

2649769 QA-ES Series II 115 V Electrosurgery Analyzer – US
2651725 QA-ES Series II 230 V Electrosurgery Analyzer – SCHUKO
2770445 QA-ES Series II 230 V Electrosurgery Analyzer – UK
2770450 QA-ES Series II 230 V Electrosurgery Analyzer – AUS
3096390 QA-ES Series II 100 V Electrosurgery Analyzer – JPN

RF303RS

Electrosurgery Analyzer

FLUKE® Biomedical

RF303RS Electrosurgery Analyzer provides enough user-selectable test loads to do routine maintenance checks on most electrosurgery units on the market today. Compact and portable, the device is so simple to use that technicians can become proficient with the RF303RS within minutes.

The unit measures ESU output and high-frequency leakage, allows for verification tests on the return electrode contact quality monitors, and has an oscilloscope output for waveform viewing. Instantaneous output or selectable sample times provide extra versatility. The instantaneous mode is sufficient for most units, but if output readings are variable and require stabilizing, the signal-averaging mode allows users to manually select two additional, slower sampling times to produce an accurate average reading.

Key features

- Easy to use simple configuration
- Oscilloscope output, high-frequency leakage, and return electrode contact quality monitor tests
- Instantaneous and signal-averaging measurement mode
- Ability to connect with Fluke Biomedical's medTester 5000C for automated solution
- RS-232 port for computer control
- Battery powered
- 4-digit numeric LCD with backlight and power-save mode

Specifications

Modes of operation	Line powered, battery powered, offline (battery maintenance charge)
Test parameters	Power (W), HF current (mA), test load (Ω)
Tests performed generator output	HF leakage (performs to IEC 601 2-2, 1289-2, ANSI/AAMI standards)
	Type BF test 1: Earth-referenced monopolar output
	Type BF test 2: Earth-referenced monopolar output
	Type CF/bipolar: Isolated monopolar or bipolar output
Current measurement (leakage)	Range: 30 mA to 2500 mA rms Resolution: 1 mA Accuracy: ± 2.5 % of reading or ± 15 mA (whichever is greater)
Power measurement (output)	Range: 1 Ω to 400 Ω Resolution: 0.1 Ω Accuracy: ± 5 % of reading or ± 3 W (whichever is greater)
Bandwidth of rms converter circuit (1 % accuracy)	Flat response: 10 kHz to 10 MHz -3 dB points: 1 kHz to 20 MHz
Frequency response	System response: -3 dB points, 1 kHz to 10 MHz at 300 Ω
CQM test	50 Ω to 750 Ω, 50 Ω steps
Test load section	Number of selections: 15
	Range: 50 Ω to 750 Ω
	Step size: 50 Ω
	Accuracy (dc to 500 KHz): ± 4 % of selected value measured at calibration to ± 1 % (across the entire operating temperature range)
	Duty cycle: 50 % @ 400 W (max 30 sec ON during any 1 minute period)
	Resonance impedance variation: ± 0.5 dB max (< 10 MHz)
Auxiliary leakage test load	Fixed: 200 Ω Accuracy: ± 4 % Power rating: 225 W
Input capacitance (nominal)	Active to dispersive: 30 pF Active or dispersive to earth ground: 40 pF
Oscilloscope output	Transformer coupled output, uncalibrated Connector type: BNC

RF303RS

Electrosurgery Analyzer

FLUKE® Biomedical

Specifications

Battery	Type: Sealed lead-acid
	Time between recharge: Two hours (continuous use)
	Time to full charge: Eight hours
	Number of cycles: 200
	Capacity: 2.2 A H
	Field serviceable: No
	Recharging: Internal, automatic charger; power cord required
Front-panel controls/push buttons	Measurement select (1)
	Load select: Increment test load (+) one step; decrement test load (–) one step
Top-panel input connections	**Designations:** • Generator output-active (1) • Generator output-dispersive (2) • Signal earth/ground reference (2) • Auxiliary HF leakage load (2)
	Connector type: 4 mm (0.16 in) diameter safety sockets
	Input voltage limit: 10,000 V peak
	Input current limit: 3 A rms
	Installation category: II
Side input connection	Designation: Signal reference
Calibration period	Recommended calibration: Every 12 months
Power requirements	Universal input switching supply (12 V dc output)
	Operating voltages: • Specified: 115 V ac/230 V ac • Max Range: 83 V ac to 264 V ac
	Operating frequencies: • Specified: 50 Hz/60 Hz • Max range: 47 Hz to 63 Hz
	Fusing external (user-replaceable): • Quantity: 2; 250 V, 3.15 A, Type F, L1 and L2
	Maximum input requirement: 60 VA
Temperature	Operating: 15 °C to 35 °C (59 °F to 95 °F) Storage: 0 °C to 50 °C (32 °F to 122 °F)
Humidity range	90 % non-condensing
Altitude	To 6,562 ft (2,000 meters)
Ventilation	Internal fan with variable speed control; over-temperature detector; magnetic tachometer sensor to detect blocked fan rotor
Display	LCD, 7-segment, 4 full digits, 2 in x 0.75 in
Case construction	High-impact plastic, UL94-V0
Dimensions (WxDxH)	33.7 cm x 29.2 cm x 15.2 cm (13.25 in x 11.5 in x 6 in)
Weight	5.6 kg (14.2 lb)

Optional accessories

2248587 Multipurpose Hard-Sided, Watertight Carrying Case

2204472 Serial Cable for D9F-D9F

2238659 Interface Cable, medTester to RF303RS (RS-232; male DB9 to female DB9; adapter required, p/n 2391789)

2391789 Adapter for Interface Cable, medTester to RF303RS (male DB9 to female DB25; used with interface cable, p/n 2238659)

Included accessories

2202027 User Manual

2202009 Accessory Kit

Accessory kit includes the following:

2200904 Active Safety Lead

2200872 ESU Dispersive Safety Lead

2200860 ESU CQM Safety Lead

2200885 ESU Case Safety Lead

2200897 ESU Jumper Safety Leads (2)

2196071 Active Safety Clip, yellow

2196080 Case Safety Clip, green

2183792 Fuses (2) 5X20 F3.15A 250V CE

2242165 Ground Pin Adapter

Detachable Power Cord (country specific)

Ordering information

2251504 ESU303RS – US 120 V

2394461 ESU303RS – AUS 250 V

2394477 ESU303RS – DEN 250 V

2394489 ESU303RS – SHK 250 V

2394492 ESU303RS – ISR 250 V

2394509 ESU303RS – ITAL 250 V

2394511 ESU303RS – IND 250 V

2394527 ESU303RS – SWZ 250 V

2394530 ESU303RS – UK 250 V

IDA 4 Plus

Infusion Device Analyzer

FLUKE® Biomedical

IDA 4 Plus Infusion Device Analyzer maximizes productivity with multiple, independent channels for testing up to four infusion pumps at once.

The device measures instantaneous flow, average flow, occlusion pressure, and analyzes patient-control analgesia (PCA) units. An optional PCA trigger box provides automated PCA pump control, allowing technicians to set up tests and walk away.

An autostart feature simplifies syringe pump testing or other tests that have long startup times.

With built-in memory, the IDA 4 Plus records test results internally and provides easy-to-read test-result graphs right on the analyzer's screen. The display is so large numbers can be read from across the room

Additionally, the IDA 4 Plus comes with Hydrograph PC software for creating full-color graphs and reports. For automated testing, the IDA 4 Plus is compatible with Fluke Biomedical's medTester 5000C (US only).

CE

N10140

Key features

- Tests up to four infusion pumps simultaneously
- Compatible with virtually any type of infusion device
- Instantaneous and average flow measurement
- Occlusion pressure measurements to 45 psi
- Single- and dual-flow (piggyback) testing
- Full PCA testing (bolus volume, lockout time, and automated external triggering)
- Autostart mode enables unit to begin testing only when fluid is detected
- On-board graphing of pressure and flow
- Built-in memory to save test results for printing or downloading to computer
- Hydrograph graphical software to control unit and display results via PC
- Automated testing through Fluke Biomedical medTester 5000C (US only)
- RS-232 ports, keyboard, printer, and alarm/PCA

Specifications

Flow-rate measurement	
Technique	Calculated by measuring a volume over time
Range	0.5 ml/hr to 1000 ml/hr
Accuracy	1 % of reading ± 1 LSD for flows of 16 ml/hr to 200 ml/hr for volumes over 20 ml; otherwise, 2 % of reading ± 1 LSD after delivery of 10 ml
Volume measurement	
Technique	Volume measured directly by the transducer in minimum sample sizes of 60 µl
Range	0.06 ml to 9999 ml
Accuracy	1 % of reading ± 1 LSD for flows of 16 ml/hr to 200 ml/hr for volumes over 20 ml; otherwise, 2 % of reading ± 1 LSD after delivery of 10 ml
PCA bolus measurement	
Technique	Volume is measured directly by the transducer in minimum bolus volumes of 0.5 ml. The measurement is made with a continuous rate between 0 ml/hr and 30 ml/hr. The bolus flow rate should be at least four times the basal flow rate for reliable detection of boluses
Minimum bolus volume	0.5 ml
Accuracy	See volume measurement
Pressure measurement	
Technique	Direct occlusion of the infusion line and measurement of pressure prior to the glass transducer
Range	0 psi to 45 psi and equivalents in mmHg and kPa
Accuracy	1 % of full scale ± 1 LSD
Back pressure	-100 mmHg to 300 mmHg

Optional PCA Trigger Box

IDA 4 Plus

Infusion Device Analyzer

FLUKE® Biomedical

Specifications

Electrical specifications	
Supply voltage	Autoswitching 90 V ac to 260 V ac
Supply frequency	50 Hz to 60 Hz
Supply power	< 30 VA
Fuse	20 mm 250 V, 1 A (T) (slow blow)
Earth leakage current	< 1 mA in single fault condition
Environmental conditions	
Operating temperature	15 °C to 30 °C (59 °F to 86 °F)
Storage temperature	0 °C to 40 °C (32 °F to 104 °F) at 85 % RH or less for storage (Do not leave for more than 48 hours at -20 °C/-4 °F)
General information	
Dimensions (LxWxH)	19.05 cm x 18.11 cm x 30.18 cm (7.5 in x 7.2 in x 11.9 in)
Weight	5 kg (11 lb)

Optional accessories

2245061 External mini-keyboard, 83-key with PS/2 connector and AT adapter
2238072 Parallel Printer Cable (D25M-36M)
2209703 PCA Trigger/Nurse Call Box
2248899 Printer, Seiko DPU-414-30B (120 V power supply) (additional purchase required: parallel printer cable, p/n 2238072)
2399531 Printer, Seiko DPU-414-30B (220 V power supply) (additional purchase required: parallel printer cable, p/n 2238072)
2235375 Printer (120 V power supply)
2235382 Printer (220 V power supply)
2392046 Serial Cable
2200102 Interface Cable, medTester to IDA 4 Plus (without wedge adapter) (RS-232; female DB25 to female DB9)
2201042 Interface Cable, medTester to IDA 4 Plus (with or without wedge adapter) (RS-232; female DB25 to female DB9)
2245092 Barcode Scanner (with long-reach coil cable with Y connector for keyboard attachment)

Included accessories

2213506 Electronic User Manual and HydroGraph software
2217231 20 ml Priming Syringe
2391750 Luerlock-3 way (one for each channel)
2238909 5-foot Plastic Drain Line

Ordering information

IDA 4 Plus One-Channel Infusion Device Analyzer
2250063 IDA-4P/1-US120V (US)
2394575 IDA-4P/1-AUS250V (Australia)
2394582 IDA-4P/1-DEN250V (Denmark)
2394594 IDA-4P1-SHK250V (Shuko)
2394608 IDA-4P/1-ISR250V (Israel)
2394613 IDA-4P/1-ITAL250V (Italy)
2394624 IDA-4P/1-IND250V (India)
2394636 IDA-4P/1-SWZ250V (Switzerland)
2394649 IDA-4P/1-UK250V (UK)

IDA 4 Plus Two-Channel Infusion Device Analyzer
Full testing for up to two infusion pumps simultaneously
2250088 IDA-4P/2-US120V (US)
2394651 IDA-4P/2-AUS250V (Australia)
2394660 IDA-4P/2-DEN250V (Denmark)
2394672 IDA-4P/2-SHK250V (Shuko)
2394685 IDA-4P/2-ISR250V (Israel)
2394697 IDA-4P/2-ITAL250V (Italy)
2394703 IDA-4P/2-IND250V (India)
2394715 IDA-4P/2-SWZ250V (Switzerland)
2394726 IDA-4P/2-UK250V (UK)

IDA 4 Plus Three-Channel Infusion Device Analyzer
Full testing capability for up to three infusion pumps simultaneously
2250109 IDA-4P/3-US120V (US)
2394732 IDA-4P/3-AUS250V (Australia)
2394744 IDA-4P/3-DEN250V (Denmark)
2394759 IDA-4P/3-SHK250V (Shuko)
2394767 IDA-4P/3-ISR250V (Israel)
2394771 IDA-4P/3-ITAL250V (Italy)
2394780 IDA-4P/3-IND250V (India)
2394798 IDA-4P/3-SWZ250V (Switzerland)
2394800 IDA-4P/3-UK250V (UK)

IDA 4 Plus Four-Channel Infusion Device Analyzer
Full testing capability for up to four infusion pumps simultaneously
2250127 IDA-4P/4-US120V (US)
2394817 IDA-4P/4-AUS250V (Australia)
2394821 IDA-4P/4-DEN250V (Denmark)
2394839 IDA-4P/4-SHK250V (Shuko)
2394842 IDA-4P/4-ISR250V (Israel)
2394856 IDA-4P/4-ITAL250V (Italy)
2394863 IDA-4P/4-IND250V (India)
2394874 IDA-4P/4-SWZ250V (Switzerland)
2394888 IDA-4P/4-UK250V (UK)

FLUKE®
Biomedical

ESA620

Electrical Safety Analyzer

The ESA620 Electrical Safety Analyzer represents the next generation in manual, portable electrical safety testers. With selections of three test loads, two protective earth test currents, and two insulation test voltages this versatile product can be used worldwide to enhance productivity and test to standards of choice.

New DSP technology offers better accuracy of leakage measurements throughout the ranges specified in the standards.

Equipped with ten safety-enhanced ECG posts, the ESA620 offers simulation of ECG and performance waveforms so both electrical safety and basic tests on patient monitors can be performed with a single connection. When used with optional Ansur computer-based software plug-in, the ESA620 becomes automated. This allows for standardization of test procedures, capturing and storage of results, comparison to standard limits, and printing of reports thus enabling the sophisticated performance of the high-end electrical safety analyzers.

CE

C SP US

N10140

Specifications

Voltage	
Range (mains voltage)	90 V ac to 132 V ac rms, 180 V ac to 264 V ac rms
Range (accessible voltage)	0 V ac to 300 V ac rms
Accuracy	± (2 % of reading +2 LSD)
Earth resistance	
Modes	Two terminal or four terminal
Test current	> 200 mA ac or 25 A ac
Ranges	0 Ω to 2 Ω
Accuracy	± (2 % of reading +0.005 Ω)
Equipment current	
Mode	AC rms
Range	0 A to 20 A
Accuracy	± 5 % of reading ± (2 counts or 0.2 A, whichever is greater)
Leakage current	
Patient load selection (input impedance)	AAMI ES1-1993 Fig 1 IEC 60601: Fig 15 IEC 61010: Fig A-1
Crest factor	≤ 3
Ranges	0 µA to 199.9 µA 200 µA to 1999 µA 2.0 µA to 10.0 mA
Frequency response	DC to 1 kHz 1 kHz to 100 kHz 100 kHz to 1 MHz
Accuracy	± (1 % of reading + 1 µA) ± (2 % of reading + 1 µA) ± (5 % of reading + 1 µA)

Key features

- Superior compliance with multiple standards: IEC60601, IEC62353, VDE 751, ANSI/ AAMI ES1:1993, NFPA-99, AN/ NZS 3551, IEC61010o
- Three test loads
- Expanded leakage ranges through 10,000 µA
- Dual-lead resistance, leakage, and voltage tests
- AC only, dc only and true-rms leakage readings
- 100 % and 110 % mains voltage for mains on applied part (lead isolation) test
- 200 mA and 25 A AC PE test current
- DSP filter technology for improved accuracy in leakage measurements
- 20 A equipment currento
- More applied parts selections
- ECG and performance waveforms
- Intuitive user interface o
- Easy-to-use applied parts (ECG) connections
- Insulation posts on applied parts connections
- Five different insulation tests
- Varying insulation test voltage 500 V dc and 250 V dc
- 2- or (optional) 4-wire ground wire resistance
- Large display with adjustable contrast
- Ergonomic design
- Optional Ansur plug-in software
- USB connection
- CE, C-TICK and CSA for USA and Canada
- RoHS compliance

ESA620

Electrical Safety Analyzer

FLUKE® Biomedical

Specifications

Leakage current (continued)	
Mains on applied part test voltage	110 % of mains @ 230 V for IEC 60601 100 % of mains @ 115 V per AAMI 100 % of mains @ 230 V per 62353
Differential leakage	
Ranges	10 µA to 199 µA 200 µA to 1999 µA 2 mA to 20 mA
Accuracy	± 10 % of reading ± (2 counts or .2 µA, whichever is greater)
Insulation resistance	
Ranges	0.5 MΩ to 20 MΩ 20 MΩ to 100 MΩ
Accuracy	± (2 % of reading + 2 counts) ± (5 % of reading + 2 counts)
Source test voltage	500 V dc 250 V dc
ECG performance waveforms	
Accuracy	± 2 % ± 5 % for amplitude of 2 Hz square wave only, fixed @ 1 mV Lead II configuration
Waveforms	**Rates** ECG complex (BPM): 30, 60, 120, 180, and 240
	Ventricular fibrillation Square wave (50 % duty cycle) (Hz): 0.125 and 2 Sine wave (Hz): 10, 40, 50, 60, and 100 Triangle wave (Hz): 2 Pulse (63 ms pulse width): 30 and 60
Power ratings	
Mains voltage outlet	120 V ac 230 V ac
Mains voltage inlet power range	90 V ac to 132 V ac rms 180 V ac to 264 V ac rms
Maximum current	20 A @ 120 V ac 16 A @ 230 V ac
Hz	50 or 60
Physical case	
Dimensions (LxWxH)	31 cm x 23 cm x 10 cm (12.2 in x 9 in x 2.9 in)
Weight	4.7 kg (10.25 lb)
Certifications	
Certifications	CE: IEC/EN61010-1 2nd Edition; Pollution degree 2 CSA: CAN/CSA-C22.2 No 61010-1; UL61010-1 C-Tick: Australian EMC

Optional accessories

3116463 Ansur ESA620 Plug-In
1903307 Retractable Test Leads
2242165 Ground Pin Adapter
2067864 Kelvin Cable Set for 4-wire Measurement
1626219 Data Transfer Cable

Included accessories

2814967 Operator's Manual CD
2814971 Multilingual Getting Started Guide
ESA620 Accessory Kit (country specific)
2195732 15 A to 20 A adapter (USA only)
2814980 Carry case
Power cord (country specific)
Test Lead Set

Ordering information

2785725 ESA620 Electrical Safety Analyzer US, 115V 20A
3051408 ESA620 Electrical Safety Analyzer EUR, 230V
3051390 ESA620 Electrical Safety Analyzer FR, 230V
3051413 ESA620 Electrical Safety Analyzer ISR, 230V
3051424 ESA620 Electrical Safety Analyzer ITA, 230V
3051436 ESA620 Electrical Safety Analyzer AUS, 230V
3051449 ESA620 Electrical Safety Analyzer UK, 230V
3051451 ESA620 Electrical Safety Analyzer SWI, 230V

ESA601

Electrical Safety Analyzer

ESA601 Electrical Safety Analyzer tests laboratory and hospital equipment to both US and international standards. Users simply flip a switch to change between AAMI or IEC electrical safety testing load. The US version includes overlays in AAMI or IEC nomenclature so technicians use the terms that are most familiar to them. Multiple language overlays, outlets, and power cords are available for convenient use in many countries.

N10140

Ten applied part connections allow for lead-to-ground (patient), lead-to-lead (patient auxiliary), and lead isolation (mains on applied part) leakage testing of equipment with multiple applied parts.

Designed for on-the-go testing, the portable analyzer is lightweight and compact and comes with a sturdy handle for easy carrying.

For an automated solution, Fluke Biomedical's Ansur software plug-in for the ESA601 allows technicians to use a PC to run autosequences, document results, and print reports.

Key features

- Selectable AAMI or IEC test loads
- Ten applied parts-lead connectors
- 90 V (min) to 264 V (max) autoswitching power supply
- Dual-lead leakage and dual-lead voltage tests
- Easy-to-read display
- Compact and portable
- Ansur plug-in software available to automate testing and document results
- Multiple outlets and power cords for compatibility in multiple countries
- Overlays in English, German, French, and Italian
- Overlay for USA version with either IEC or AAMI nomenclature
- RS-232 serial port for PC control and printing

Specifications

Power	
Mains power operating range	90 min to 264 max V ac (47 Hz to 63 Hz), autoswitching
Power ratings	16 A at 264 V max
Mains inlet	
Mains inlet	The instrument uses a standard IEC 60320-1/C20 mains inlet rated at 16 A and 250 V for class-1 equipment in cold conditions.

Product comparison chart

Model	**175**	**180**	**232D**	**ESA620**
Test modes	Manual	Manual	Manual	Manual
	–	–	–	Automated with Ansur
	–	–	–	–
Test loads	AAMI	AAMI	AAMI	AAMI
	–	–	–	IEC60601-1
	–	–	–	IEC61010
PE test current	10 mA dc	10 mA dc	10 mA dc	200 mA ac 25 mA ac
20A device testing	No	Yes	No	Yes
ECG waveforms	no	No	Yes	Yes

ESA601

Electrical Safety Analyzer

FLUKE® Biomedical

Specifications

Voltage measurements	
Range (mains voltage)	90 V to 264 V true-rms
Range (accessible voltage)	0 V to 264 V true-rms
Accuracy	± 2 % of reading ± 2 V dc
Earth-resistance measurements	
Range	0 Ω to 1.999 Ω
Accuracy	± 2 % of reading ± 5 mΩ
Current source amplitude	1 A dc (± 10 %)
Insulation measurements	
Range	0.5 M to 100 MΩ
Accuracy	0.5 MΩ to 20 MΩ, ± 2 % of reading, ± 200 kΩ; above 20 MΩ, ± 5 % of reading, ± 200 kΩ
Voltage source amplitude	500 V dc (± 10 %)
VDE differential current	
Range	10 µA to 10000 µA
Accuracy	± 2 % of full scale
Leakage-current measurements	
Measurement range	0 µA to 8000 µA true-rms
Accuracy	± 1 % of reading (± 2 µA) @ dc and 25 Hz to 100 Hz;* ± 2.5 % of reading (± 2 µA) 1 kHz to 200 kHz (full-scale input)*† * Full scale input † Accuracy of mains-on-applied-part leakage currents: ± 2 % of reading ± 6 µA
	Frequency response: DC to 1 MHz (-3 dB)
Crest factor	< 3
Input impedance	Per figure 15 of IEC601-1 or AAMI ES 1
Environmental specs	
Operating temperature	10 °C to 40 °C (50 °F to 104 °F)
Storage temperature	-25 °C to 50 °C (-13 °F to 122 °F)
Maximum humidity	80 % relative humidity up to 31 °C (88 °F), decreasing linearly to 50 % relative humidity at 40 °C (104 °F)
Dimensions (LxWxH)	24.0 cm x 21.1 cm x 7.6 cm (9.8 in x 8.2 in x 3.0 in)
Weight	2.4 kg (5.2 lb)

Model	**ESA601**	**ESA601 Pro SeriesXL**	**medTester 5000C**
Test modes	Manual	Automatic	Automatic
	Automated with Ansur	Stepwise	Manual
	–	Manual	–
Test loads	AAMI	AAMI	AAMI
	IEC60601	IEC60601	–
	–	IEC61010	–
PE test current	1 A dc	1 A ac 10 A ac 25 A ac	100 mA dc
20A device testing	No	No	Yes
ECG waveforms	No	Yes	Yes

Optional accessories

2556755 Ansur ESA601 Plug-in
2004175 Alligator Clamp
2391669 Banana/ECG Adapter
2248899 Printer, Seiko DPU-414-30B (with choice of 120 V power supply, p/n 2235375; or 220 V power supply p/n 2235382)
2185787 North American 220 V Adapter Kit
2238659 Interface Cable (RS-232; male DB9 to female DB9)

Included accessories

2388919 User Manual and Ansur ESA601 Plug-in Demo Software on CD
2243822 Getting Started Guide
2248650 Soft-sided Carrying Case
2391738 Red Lead
2391723 Black Lead
2391714 Alligator/Banana Adapters (five each)

Ordering information

2249883 ESA601-AUS (ESA601 Electrical Safety Analyzer with Australian outlet, Australian line cord, and English 1 overlay)
2249909 ESA601-DEU (ESA601 Electrical Safety Analyzer with Schuko outlet, Schuko line cord, and German overlay)
2249927 ESA601-FRA (ESA601 Electrical Safety Analyzer with Schuko outlet, Schuko line cord, and French overlay)
2249948 ESA601-ITAL (ESA601 Electrical Safety Analyzer with Schuko outlet, Schuko line cord, and Italian overlay)
2434154 ESA601-ISR (ESA601 Electrical Safety Analyzer with Israeli outlet, Israeli line cord, and English 1 overlay)
2404834 ESA601-SHK (ESA601 Electrical Safety Analyzer with Schuko outlet, Schuko line cord, and English 1 overlay)
2249966 ESA601-UK (ESA601 Electrical Safety Analyzer with UK outlet, UK line cord, and English 1 overlay)
2249982 ESA601-USA/IEC (ESA601 Electrical Safety Analyzer with US outlet, US line cord, and English 1 overlay utilizing IEC nomenclature)
2404852 ESA601-USA (ESA601 Electrical Safety Analyzer with US outlet, US line cord, and English 2 overlay utilizing AAMI [NFPA99] nomenclature)

Note: All ESA601 models have the same testing abilities.

601 Pro Series$_{XL}$

Electrical Safety Analyzer

FLUKE® Biomedical

Key features

- IEC60601-1, IEC61010-1, and ANSI/AAMI ES1 test loads, user selectable
- Multiple patient-applied-part types
- Power ON/OFF delays
- DC-only current for patient- and auxiliary-leakage tests
- User-programmable test sequences
- Manual, auto, step, and computer-control modes
- 1 A, 10 A, or 25 A ac protective-earth-resistance test circuit
- Memory for up to 1000 device-information records
- Integrated printer

N10140

The 601 Pro Series$_{XL}$ is the most advanced Electrical Safety Analyzer on the market. The One-Touch-Testing user interface is an industry exclusive that allows the user to perform rapid tests on various medical devices without having to maneuver around cumbersome menus. This full-featured safety analyzer combines the IEC60601-1, IEC61010-1, and ANSI/AAMI ES1 standard test loads into one device, so you can do all your testing at once.

Templates feature reduces your data entry, making your electrical-safety testing faster and easier!

Save the protective-earth test current at the default value you prefer, whether it is 1 A, 10 A, or 25 A. You are no longer limited to the 1 A default.

Specifications

	Voltage (single and dual lead)	Insulation resistance	Protective earth resistance	Current consumption
Range	0 V to 300 V	0.5 MΩ to 400 MΩ	0 to 2.999	0 A to 15 A
Accuracy	DC to 100 Hz ± 1.5 % of reading ± 1 LSD	± 5 % of reading ± 2 LSD	± 5 % of reading ± 4 mΩ (1 A, 10 A, and 25 A test currents)*	± 5 % of reading ± 2 LSD

*For additional specifications qualifying the varying effects on accuracy, please contact us.

601 Pro Series$_{XL}$

Electrical Safety Analyzer

FLUKE® Biomedical

Specifications

IEC60601-1 and AAMI leakage current	
Range	0 µA to 8000 µA true-rms or dc only
Accuracy	(per IEC60601-1 or AAMI) DC to 1 kHz ± 1 % of reading ± 1 µA 1 kHz to 100 kHz ± 2 % of reading ± 1 µA 100 kHz to 1 MHz ± 5 % of reading ± 1 µA
Mains on applied part , equivalent device, and equivalent patient l eakage current tests the following exceptions apply	
Applied voltage	≥ 110 % of mains voltage
Accuracy	± 2 % of reading ± 6 µA
IEC61010-1 leakage current	
Range	0 µA to 16000 µA true-rms or dc only
Accuracy	(per IEC 61010-1 Fig. A.1 filter) DC to 1 kHz ± 2 % of reading ± 1 µA 1 kHz to 100 kHz ± 4 % of reading ± 2 µA 100 kHz to 1 MHz ± 10 % of reading ± 10 µA
Waveform simulation	
Normal sinus rhythm	30 BPM, 60 BPM, 120 BPM, 180 BPM, and 240 BPM
Performance pulse	30 BPM and 60 BPM
Sine	10 Hz, 40 Hz, 50 Hz, 60 Hz, and 100 Hz
Square	0.125 Hz 2 Hz (50 % duty cycle)
Triangle	2 mV 2 Hz
Arrhythmia	A-Fib A-Flutter A-TAC Idioventricular PVC1 R-on-T Run V-Fib V-Tach
Performance	± 2 % of reading for rate of ± 5 % of reading for amplitude, fixed at 1 mV peak on a Lead II ECG connection (except for triangle wave, which is 2 mV peak to peak)
General	
Power	Autoswitching, 90 V ac to 265 V ac
Dimensions (LxWxH)	42.2 cm x 30 cm x 14.1 cm (16.62 in x 11.75 in x 5.56 in)
Weight	7.7 kg (17 lb)

Optional accessories

2248899 External Parallel Printer Port
2245061 Compact Keyboard
2234065 Carrying Case
2238659 RS-232 Cable
2245092 Barcode Scanner (optical)
2238072 Parallel Printer Cable, D25M-C36M
2235375 120 V ac Adapter
2235382 220 V ac Adapter

Included accessories

2234222 Operator's Manual
2391723 Black Test-Lead Set
2391738 Red Test-Lead Set

Ordering information

2250323 601 Pro Series$_{XL}$—SHKP: Schuko receptacle, english overlay, with internal printer
2250314 601 Pro Series$_{XL}$—SHK: Schuko receptacle, english overlay, without internal printer
2250361 601 Pro Series$_{XL}$—UKP: UK receptacle, english overlay, with internal printer
2250350 601 Pro Series$_{XL}$—UK: UK receptacle, english overlay, without internal printer
2250306 601 ProSeries$_{XL}$—AUSP: Australian receptacle, english overlay, with internal printer
2250298 601 Pro Series$_{XL}$—AUS: Australian receptacle, english overlay, without internal printer
2250389 601 Pro Series$_{XL}$—USP: US receptacle, english overlay, with internal printer
2250377 601 Pro Series$_{XL}$—US: US receptacle, english overlay, without internal printer
2250345 601 Pro Series$_{XL}$—GP: Schuko receptacle, german overlay, with internal printer
2250338 601 Pro Series$_{XL}$—G: Schuko receptacle, english overlay, without internal printer

FLUKE®
Biomedical

180

Electrical Safety Analyzer

N10140

The handheld 180 Electrical Safety Analyzer is a lightweight, portable device for testing electrical systems, medical devices, and physiological instrumentation. The device includes the AAMI test load and has five jacks for patient applied parts testing.

Small enough to fit in a briefcase, the analyzer works well as a bench-top instrument in the laboratory or a portable testing device in the mobile engineer's toolbox. With its uncomplicated design, the 180 is simple to use. A single master function switch, directly labeled with the test to be performed, leads the user through a complete measurement procedure.

The analyzer uses simple, yet sophisticated, electronics for true-rms measurement of current and voltage. The 180 also performs dual-lead leakage and resistance tests.

Key features

- Handheld
- Self-switching 120 V and 240 V operation
- 15 A and 20 A capabilities
- Five patient applied parts jacks
- Dual-lead testing

Specifications

Operating mains voltage range	90 V ac to 240 V ac
Current capacity for DUT	Line 90 V to 140 V: 20 A for 5 min, 15 A for 30 min; line over 140 V: 10 A
Line-voltage measurement	
Range	90 V to 240 V
Accuracy	± 3 % of reading ± 1 LSD
Load-Current measurement	
Range	1 A to 19.99 A
Accuracy	± 5 % of reading ± 1 LSD
Leakage-current measurement	
Range	0 µA to 1999 µA
Accuracy	DC and 25 Hz to 1 kHz: ± 1 % of reading ± 1 µA; 1 kHz to 100 kHz: ± 2.5 % of reading ± 1 µA; 100 kHz to 1 MHz: ± 5 % of reading ± 1 µA
Measurement type	True-rms; input impedance per AAMI ES1-1993
Isolation test	
Isolation source voltage	110 % of mains, ± 5 % of reading
Current limit	1 mA @ 120 V ac
Resistance measurement	
Range	0.01 Ω to 19.99 Ω
Accuracy	± 1 % of reading ± 1 LSD
Resolution	0.01 Ω
Current source	10 mA dc
Environmental requirements	
Operating temperature	15 °C to 40 °C (59 °F to 104 °F)
Storage temperature	-20 °C to 65 °C (-4 °F to 149 °F)
Relative humidity	90 % max
Mains voltage range	90 V to 240 V
General information	
Display	LCD 3.5 digit
Dimensions (LxWxH)	13.3 cm x 18.4 cm x 5.4 cm (5.25 in x 7.25 in x 2.1 in)
Weight	Max weight 1 kg (2.25 lb)

Optional accessories

2248864 Soft-sided Vinyl Carrying Case
2392409 Chassis Cable, coil cord, 8-foot extended
2392411 Chassis Cable, coil cord, 16 foot extended
2392448 External Leakage Cable, coil cord, 8 foot extended
2231563 External Leakage Cable, coil cord, 16 foot extended
2185787 North American 220 V adapter kit

Included accessories

2185754 User Manual
2392409 Test Lead 8 foot, black

Ordering information

2249852 ESA180-US 90-265 V

FLUKE®
Biomedical

175

Electrical Safety Analyzer

N10140

The 175 Electrical Safety Analyzer is ideal for performing quick electrical safety checks on electrical systems, medical devices, and physiological instrumentation.

Small enough to fit in a briefcase, the analyzer works well as a bench-top instrument in the laboratory or a portable testing device in the mobile engineer's toolbox.

With its uncomplicated design, the 175 is simple to use. A single master function switch, directly labeled with the test to be performed, leads the user through a complete measurement procedure. The unit features both IEC601-1 and AAMI test loads. Technicians simply flip a switch to perform leakage measurements to a particular standard.

The analyzer uses simple, yet sophisticated, electronics for true-rms measurement of current and voltage. The 175 also performs dual-lead leakage tests.

Key features

- Portable
- IEC601-1 and AAMI test loads
- Self-switching 120 V and 240 V operation
- Dual-lead testing

Specifications

Operating mains voltage range	90 V ac to 240 V ac
Current-capacity for DUT	15 A for 10 min
Voltage measurement	
Range	90 V to 240 V
Accuracy	± 3 % of reading ± 1 LSD
Load-current measurement	
Range	1 A to 19.99 A
Accuracy	± 5 % of reading ± 1 LSD
Resistance measurement	
Range	0.01 Ω to 19.99 Ω
Accuracy	± 1 % of reading ± 1 LSD
Resolution	0.01 Ω
Current source	10 mA dc
Leakage-current measurement	
Range	0 µA to 1999 µA
Accuracy	DC and 25 Hz to 1 KHz: ± 1 % of reading ± 1 µA; 1 KHz to 100 KHz: ± 2.5 % of reading ± 1 µA; 100 KHz to 1 MHz: ± 5 % of reading ± 1 µA
Measurement type	True-rms
Input impedance	1000 Ω per AAMI ES1-1993, IEC601-1
Environmental requirements	
Operating temperature	15 °C to 40 °C (59 °F to 104 °F)
Storage temperature	-20 °C to 50 °C (-4 °F to 122 °F)
Relative humidity	Max 80 % up to 31 °C (88 °F), decreasing linearly to 50 % at 40 °C (104 °F)
General information	
Display	LCD 3.5 digit
Dimensions (LxWxH)	13.3 cm x 18.4 cm x 5.4 cm (5.25 in x 7.25 in x 2.1 in)
Weight	Max weight: 1 kg (2.25 lb)

Optional accessories

2248864 Soft-sided Vinyl Carrying Case
2392409 Chassis Cable, coil cord, 8-foot extended
2392411 Chassis Cable, coil cord, 16 foot extended
2392448 External Leakage Cable, coil cord, 8 foot extended
2231563 External Leakage Cable, coil cord, 16 foot extended
2185787 North American 220 V adapter kit

Included accessories

2185754 Operator's Manual
2392409 Test Lead 8 foot, black

Ordering information

2249841 ESA175-US 90-265 V

ULT800

Ultrasound Transducer Leakage Tester

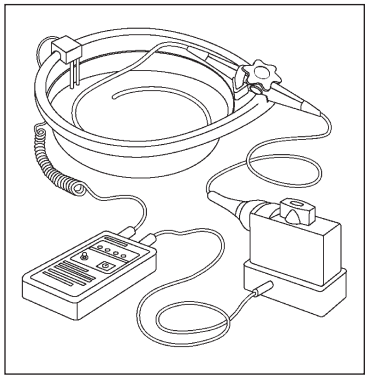
ULT800 tests the electrical safety of ultrasound transducers independent of their ultrasound machines. A variety of adapters allow for testing of many different makes and models, including transesophageal echocardiography (TEE) transducers.

With the ULT800, transducer testing easily fits into routine disinfecting procedures. Technicians conduct the tests in a cleaning basin at the beginning of the day and between patients.Simple Pass/Fail indicators make it simple to use even non-technical medical personnel, such as sonographers and central sterile-supply technicians, can perform the tests.

The ULT800 is available by itself or as a kit, which includes two transducer adapters, a dual-conductivity electrode, and carrying case.

Key features

- Handheld
- Stand-alone operation
- Direct measurement of leakage current
- Battery-operated
- Independent of 120 V or 240 V systems
- Built-in self-test circuit
- Auto shut-off to conserve battery



ULT800 Ultrasound Electrical Leakage testing system (TEE transducer not included)

Specifications

Power	9 V alkaline battery, approximately 1000 uses per battery
Conductivity	Limit to pass: > 133 µA +1 %
Leakage	Limit to pass: < 185 µA +1 %; > 20 µA +1 %
Dimensions (LxWxH)	17 cm x 10 cm x 4 cm (6.5 in x 3.7 in x 1.5 in)
Weight	0.34 kg (0.75 lb)
Operating temperature	15 °C to 40 °C (59 °F to 104 °F)
Storage temperature	15 °C to 65 °C (59 °F to 149 °F)
Humidity	90 % max

Optional accessories

2392502 Dual Conductivity Electrode
2392525 Hard-sided Carrying Case
2392569 Dual Conductivity Electrode—for use with Cidex 2032 Tray
2801776 600/220PLUS, Dual Conductivity Electrode for use with 800-Cleaning Tub,
2392533 Conductivity Adapter Cable for PCI GUS cleaning
223161 Universal Ultrasound Probe for DALE601 and DALE601E
2392427 Chassis Ground Probe for DALE601/DALE601E
2392430 Acuson/Siemens ultrasound transducer adapter for Acuson 156 and V510B Transducers
2743055 800-Cleaning Tub, Cleaning/ Testing Basin for ULT800 Testing System
2392578 Acuson/Siemens Ultrasound Transducer Adapter for Acuson 260 Transducers
2231811 Acuson/Siemens ultrasound transducer adapter for Acuson 360 Transducers
2392591 Acuson/Siemens Ultrasound Transducer Adapter for Acuson MP and 3V2c Transducers
2392516 Acuson/Toshiba Ultrasound Transducer Adapter for Acuson XP, Acuson Aspen, Acuson Capasee, Acuson 3-Needle Guide C3, ATL 3.5 DFT, Toshiba PSF-37HT, and Toshiba F Series Transducers
2392482 HP/Agilent Ultrasound Transducer Adapter (600/210)
2392494 HP/Agilent Ultrasound Transducer Adapter (600/211)
2392475 GE LogiQ Ultrasound Transducer Adapter (600/204)
2231602 GE LogiQ Ultrasound Transducer Adapter (600/205)
2392453 GE YMS/RT Ultrasound Transducer Adapter for GE YMS/RT Transducers
2392466 GE CGR Ultrasound Transducer Adapter for GE CGR radius and GE SONO Transducers
2392540 Hitachi Ultrasound Transducer Adapter
2392557 Philips Ultrasound Transducer Adapter (ATL/600/218)
800/PHILIPS-04 Ultrasound Transducer Adapter (for use with Philips iE33 and iU22 diagnostic ultrasound TEE transducers)
2540999 SonoSite TEE Ultrasound Transducer Adapter (for use with all SonoSite Transducers-including TEE)

Ordering information

2434187 ULT800 Ultrasound Transducer Leakage Tester Kits
2491569 Cust1 Ultrasound Transducer Leakage Tester Kit
Standard accessories: ULT800 (2491569), dual-conductivity electrode (2392502), and hard-sided carrying case (2392525)
2491578 Cust2 Ultrasound Transducer Leakage Tester Kit
Standard accessories: ULT800 (2491569), dual-conductivity electrode for Cidex 2032 tray (2392569), and Cidex 2032 tray and storage foam kit (2231001)

BP Pump 2

Non-Invasive Blood Pressure Simulator

The BP Pump 2 is a second-generation non-invasive blood pressure (NIBP) monitor analyzer that efficiently verifies oscillometric adult and neonatal NIBP. The BP Pump 2's unique feature set includes tests to accurately interrogate wrist-cuff monitors, internal cuff volumes, and optional 5-lead synchronized ECG simulations for spot checks on the monitor. The simulated peripheral pulse is synchronized with this electrical ECG signal for testing NIBP monitors utilizing gated measurement for noise/artifact rejection.

Key features

- Dynamic BP simulators for arm- and wrist-cuff monitors
- ECG and arrhythmia simulation synchronized with BP (optional)
- Internal pump for high- and low-pressure release verification, leak testing, and pressure sourcing
- Internal adult/neonatal cuffs elimates need for external cuffs
- Four respiratory artifacts, including spontaneous breathing and controlled ventilation
- Multiple arrhythmia simulations, including premature atrial contractions #1 and #2, atrial fibrillation, and PVCs

Specifications

Pressure generation/ measurement	Static-pressure range: 50 mmHg to 400 mmHg (53 kPa)
	Difference between target pressure and actual pressure: < 5 mmHg
	Pressure leak/relief test
	Normal sinus rhythm (BP and ECG)
	Healthy heart, weak pulse, mild exercise, strenoue exercise, obese subject, geriatric subject, tachycardia, bradycardia
	Irregular pulse (BP and ECG)
	PAC1, PAC2, PVC, atrial fib
	Four respiratory artifacts
	Three adult wrist-cuff simulations
	User-definable simulations
	Neonatal internal cuff simulations
	Autosequences: Nine for four tests; up to five simulations
Display	Bright, large 4-line x 40-character alphanumeric display with backlighting
Electrical ECG	Signals: RA, LA, RL, LL, V
	Amplitude: 1 mV peak (± 10 %) NIBP peripheral pulse synchronized with ECG signal
Pressure measurement	Units: kPa, mmHg, cmH_2O, cmH_2O and psi (user selectable)
	Range: 0 mmHg to 400 mmHg
	Resolution, BP Pump 2L (basic model) 0 mmHg to 300 mmHg: ± 0.5 % of reading ± 1 mmHg 301 mmHg to 400 mmHg: ± 2 % of reading
	Resolution, BP Pump 2M (high-accuracy version) < 0.8 mmHg (0.1 kPa)
Dimensions (WxDxH)	23.6 cm x 24.9 cm x 12.2 cm (9.3 in x 9.8 in x 4.8 in)
Weight	3.2 kg (7.1 lb)

Product comparison chart

Model	BP Pump 2	CuffLink
Wrist cuff simulations	Yes	No
ECG syncronized	Option	No
Leak test	Yes	Yes
Over pressure test	Yes	Yes
Manometer	Yes	Yes
medTester compatible	No	Yes

Optional accessories

2755836 Ansur BP Pump 2 Plug-in
2222822 Soft-sided Vinyl Carrying Case
2391894 ECG Adapter Block (allows simulation of 5-lead ECG waveforms)
2248899 Printer, Seiko DPU-414-30 B, 120 V power supply
2399531 Printer, Seiko DPU-414-30B, 200 V power supply
2238659 Serial Cable, D9M-D9F
2392328 Neonatal/external cuff mandrel (truncated plastic cylinder diameters: 7.6, 10, and 14 cm)
2391875 Wrist cuff mandrel (adult)

Included accessories

2391882 Accessory Kit (tubings and fittings)
User Manual
Power Cord (country specific)

Ordering information

BP Pump 2_L (standard pressure transducer)
2249036 $BPPUMP2_L$-US 120 V
2394895 $BPPUMP2_L$-AUS 250 V
2394901 $BPPUMP2_L$-DEN 250 V
2394912 $BPPUMP2_L$-SHK 250 V
2394920 $BPPUMP2_L$-ISR 250 V
2394935 $BPPUMP2_L$-ITAL 250 V
2394947 $BPPUMP2_L$-IND 250 V
2394958 $BPPUMP2_L$-SWZ 250 V
2394964 $BPPUMP2_L$-UK 250 V

BP Pump 2_M (high-accuracy pressure transducer)
2249049 $BPPUMP2_M$-US 120 V
2394973 $BPPUMP2_M$-AUS 250 V
2394986 $BPPUMP2_M$-DEN 250 V
2394999 $BPPUMP2_M$-SHKO 250 V
2395003 $BPPUMP2_M$-ISR 250 V
2395015 $BPPUMP2_M$-ITAL 250 V
2395026 $BPPUMP2_M$-IND 250 V
2395032 $BPPUMP2_M$-SWZ 250 V
2395044 $BPPUMP2_M$-UK 250 V

CuffLink

Non-Invasive Blood Pressure Simulator

Our CuffLink Non-Invasive Blood Pressure Simulator was the first instrument of its kind on the market. Today, CuffLink is the fundamental NIBP analyzer that delivers dynamic oscillometric, non-invasive blood pressure signals with 1 % repeatability. With features that have established our instrument as the "industry standard," CuffLink continues to make NIBP monitor testing a breeze.

Key features

- Dynamic oscillometric noninvasive blood-pressure simulation
- Automated static-pressure measurements, leakage testing, and relief-valve testing
- Five automated NIBP testing autosequences
- Five arrhythmia selections
- Adult and neonatal NIBP selections
- Adjustable heart rate values
- Direct interface with medTester 5000C

Specifications

Power	120/250 V ac, 50 Ω average, 100 Ω peak, 50/60 Hz
Analog outputs	Cuff pressure: 0 mmHg to 499.95 mmHg FS ± 1 % of reading, 10 mV/mmHg
	Pulse pressure: 0 mmHg to 5 mmHg FS ± 1 of reading, 1 V/mmHg
Digital manometer	Pressure range: -499.75 mmHg to 499.75 mmHg
	Measurement parameters: instantaneous and peak
	Input overpressure limit: ± 1500 mmHg
Displayed graphics	Dynamic real-time NIBP cuff-pressure waveform programmed peripheral pulse and envelope waveforms
Display	Alphanumeric graphic display (LCD)
	Alphanumeric mode: 8 lines x 40 characters
	Graphics mode: 64 vertical x 240 horizontal dot matrix, backlight with viewing angle adjustment
Digital interfaces	RS-232C/Serial: Bidirectional. Downloads cuff measurement data and controls test features with a compatible computer or via the medTester 5000C with the medCheck option.
	Parallel printer: Centronics compatible
	Pulse sync: 0 V dc to 5 V dc (TTL)
Cuff mandrel	Interlocking plastic blocks: four cuff circumferences, including 39.5 cm (large adult), 33 cm (adult), 26.6 cm (small adult) and 20 cm (child); maximum cuff width of 15.25 cm
	Truncated plastic cylinders: three neonatal cuff circumferences, including 14 cm, 10 cm, and 7.6 cm; maximum cuff width of 7.6 cm
Pop-off valve testing	Automatic test for operation of the monitor's relief valve
	Measurement parameters: instantaneous and peak pressure
	Maximum pressure: 499.75 mmHg
	Input overpressure limit: 1500 mmHg
System leak testing	Start pressure: 499.75 mmHg max
	Elapsed time: 60 s (fixed)
	Leak-rate range: 0.25 mmHg/min to 499.75 mmHg/min
	Pump: 2 lpm min (free flow)
Accuracy	Systolic/diastolic mean arterial pressure (MAP): 1 % of target value
	Cuff pressure: ± 1 % of reading ± 1 mmHg
	Input overpressure limit: ± 1500 mmHg

CuffLink standard accessories

FLUKE®
Biomedical

CuffLink

Non-Invasive Blood Pressure Simulator

Specifications

Cuff adapters	For insertion between the NIBP device, cuff, and analyzer; compatible with most current oscillometric NIBP monitors: • Male/female LUER Locking • Female/male LUER nonlocking taper • Male/male hose barb (large 5/32 in) • Male/male hose barb (small 1/8 in) • Male-hose-barb to hose extension (IVAC) • Male/female clippard (Critikon, Siemens) • Colder/CPC (Marquette, Protocol) • OBAC quick release (Hewlett Packard)
Autosequences	Up to five user-programmable sequences to test NIBP monitors with a specific series of cuffLink performance tests, including static pressure test, leak test, and pop-off test
	Up to eight adult-neonatal-arrhythmia dynamic NIBP selections, each of which can be cycled up to 99 times during the sequence.
	Printable test report.
Displayed real-time parameters	Instantaneous cuff pressure: 0 mmHg to 300 mmHg Peak cuff pressure: 0 mmHg to 500 mmHg peak Inflate/deflate time: 0.1 s to 999.9 s Inflate/deflate rate: 0.1 mmHg/s to 999.9 mmHg/s Total measurement time: 0 s to 999.9 s max
	Selected heart rate: Selected systolic/diastolic (mean) target values User-programmed vertical and horizontal shifts
Dynamic non-invasive blood pressure	Simulation of a range of normal, hypertensive and hypotensive dynamic noninvasive blood pressures for typical adult, infant, and neonatal patients. Generation of normal, bradycardia, and tachycardia rhythm selections with a wide range of user-programmable peripheral pulse amplitudes (weak, normal and strong). Compatible with oscillometric NIBP devices.
	Preprogrammed target value selections: Adult systolic/diastolic (MAP) (mmHg): 60/30 (40), 80/50 (62), 400/65 (75), 120/80 (90), 150/100 (115), 200/150 (165) and 255/195 (215)
	Neonatal/pediatric systolic/diastolic: above selections, excluding 255/195
	Repeatability: ± 1 % of selected target value
	Adult arrhythmia selections: • Baseline NIBP target value: (120/80) (NSR) • Atrial fibrillation (A-Fib) • Premature atrial contraction (PAC) • Premature ventricular contraction (PVC) • Missed beat (MB) • Aberrant sinus conduction (AS)
	Preprogrammed peripheral pulse waveforms: • Pulse amplitude at MAP: 2 mmHg (typical adult value) • Pulse volume range: 0 ml to 5.1 ml • Pulse rise time: 80 ms (min) • Heart rates (adult and neonate): 30 BPM, 40 BPM, 60 BPM, 80 BPM, 120 BPM, 160 BPM, 200 BPM, and 240 BPM • Heart-rate accuracy: ± 1 % of selected rate
	User-programmable target value shifts: Horizontal axis: preprogrammed target value selections shifted in 1.0 mmHg steps over a maximum range of ± 100 mmHg to increase or decrease dynamic pressure values Vertical axis: relative amplitude shifted in 1 % increments over a maximum range from 0 % to 200 % to simulate weak, normal, and strong peripheral pulses
Dimensions (LxWxH)	38.1 cm x 31.75 cm x 12.7 cm (15 in x 12.5 in x 5 in)
Weight	6.82 kg (15 lb)

Included accessories

2242915 Operator's Manual
2392832 Accessory Pouch
2245300 Adapter Kit (complete set of eight cuff/hose adapters)
2392381 Adult Cuff Mandrel Spacer Blocks (three required)
2392370 Adult Cuff Mandrel End Blocks (two required)
2392328 External Cuff Mandrel Neonatal (truncated plastic cylinder diameters: 7 cm, 6 cm, 10 cm, and 14 cm)

Ordering information

CuffLink-US120V Simulators
CuffLink-AUS250V Simulators
CuffLink-DEN250V Simulators
CuffLink-SHK250V Simulators
CuffLink-ISR250V Simulators
CuffLink-ITAL250V Simulators
CuffLink-IND250V Simulators
CuffLink-SWZ250V Simulators
CuffLink-UK250V Simulators

MPS450

Patient Simulator

The MPS450 is Fluke Biomedical's next-generation, portable, multiparameter patient simulator for your comprehensive testing and training needs. Whether it's a quick check on a bedside monitor, arrhythmia recognition training, or pe forming a complete PM on the latest patient-monitoring systems, this simulator is a clear choice with its broad range of physiological waveforms, easy-to-use interface, and compact, portable size.

Key features

- 12-lead ECG simulation with independent outputs
- 43 arrhythmia selections
- Four invasive BP channels, including Swan-Ganz simulation
- Respiration and temperature simulations
- ECG performance testing, including R-Wave detection
- Large, bright 4-line x 20-character display
- RS-232 serial port
- Expansion port
- Compact and lightweight

MPS450 optional accessories

Specifications

ECG normal sinus rhythm	12-lead configuration with independent outputs
	Amplitude: 0.05 mV to 5.5 mV
	Rates: 30 BPM to 300 BPM
	ECG waveform selections: Adult or pediatric
	Superimposed artifact: 50 Hz and 60 Hz, muscle, baseline wander, respiration
ECG performance	Amplitude: 0.05 mV to 5.5 mV Square wave: 2 Hz , 0.125 Hz Pulse: 30 BPM, 60 BPM, 60 ms pulse width Sine waves: 0.5 Hz to 100 Hz Triangle wave: 2 Hz, 2.5 Hz
ST segments	Elevated/depressed: -0.8 mV to 0.8 mV in 0.1 mV steps; plus -0.05 mV and 0.05 mV steps
Accuracy	All amplitudes ± 2% All rates ± 1% All widths ± 1%
Arrhythmia selections (43 Total)	Premature rhythms Supraventricular rhythms Ventricular rhythms Conduction defects Pacemaker
Respiration	Baseline impedance: 500 Ω to 2000 Ω, leads I, II, III Impedance variations: 3 Ω, 1 Ω, 0.5 Ω, 0.2 Ω Rates: 15 BrPM to 120 BrPM and APNEA Apnea periods: 12 seconds, 22 seconds, 32 seconds, and continuous

Product comparison chart

Model	MPS450	medSim 300B	PS420	PS415
Arrhythmia selections	43	32	35	14
Respiration	Yes	Yes	Yes	Yes
BP channels	Yes, four	Yes, four	Yes, two	Yes, two
Swan-Ganz procedure	Yes	Yes	Yes	Yes
Temperature channels	Yes, one	Yes, two	Yes, one	Yes, one
User-programmable auto-sequences	Yes (with HHC3)	Yes, internal feature plus HHC3 capability	No	Yes
Cardiac output	Optional	Optional	Standard	No

FLUKE®
Biomedical

MPS450

Patient Simulator

Specifications

Blood pressure channels	**Channels** 4; synchronized with normal sinus rhythm rates; tracks arrhythmia activity
	Transducer Exciter voltages: ac and dc compatible Sensitivity: 5 µV/V/mmHg and 40 µV/V/mmHg Calibrated Rate: 80 BPM
Available selections	Static pressure
	Dynamic pressure: Art (120/80), Radial Art (120/80), LV (120/0), RA/CVP (15/10), RV (25/0), PA (25/10), PAW (10/2), and LA (14/4)
	Swan-Ganz procedure: automated and manual control
Temperatures	0 °C, 24 °C, 37 °C, and 40 °C
Cardiac output (optional)	Faulty-injectate curve Left-to-right shunt curve C.O. for 0°: 2.5 l/min, 5 l/min, and 10 l/min C.O. for 24°: 2.5 l/min, 5 l/min, and 10 l/min Cal Pulse: 1.5° for 1 second
Fetal/Maternal ECG and IUP simulations (optional)	Fixed fetal heart rates: 60 BPM to 240 BPM
	Dynamic fetal heart activity: Uniform deceleration, uniform acceleration, early deceleration, late deceleration
	Maternal heart rate: 80 BPM
	Dynamic intrauterine pressure (IUP)
	Waveform: positive bell-shaped pressure curve
	Peak pressure: 90 mmHg, ± 4 mmHg (max)
	Contraction interval: 2 minutes, 3 minutes, and 5 minutes (manual)
	Duration: 90 seconds
Dimensions (WxDxH)	18.4 cm x 19 cm x 5 cm (7.3 in x 7.5 in x 2 in)
Weight	0.6 kg (1.4 lb)

Model	PS410	PS400	DataSim 6100
Arrhythmia selections	35	12	34
Respiration	No	No	Yes
BP channels	No	No	Yes, three
Swan-Ganz procedure	No	No	Yes
Temperature channels	No	No	No
User-programmable auto-sequences	No	No	Yes
Cardiac output	No	No	Optional

Optional accessories

2248623 Soft-sided Vinyl Carrying Case
2238659 Serial Cable D9M-D9F
2184298 AC Battery Eliminator
2645641 HHC3 Handheld Controller

Temperature cables, blood-pressure cables, and cardiac output adapters: see web site for complete list

Included accessories

2226608 Cardiac Output Box MPS450-FET
2243350 User Manual

Ordering information

2251364 MPS450 (ECG 12-lead simulation; invasive BP; respiration; temperature; BP in sync with ECG; large, bright 4-line x 20-character display; R-wave-detection test; RS-232 port for computer control; soft-key navigation; universal ECG connectors; and flash memory for easy program upgrade)

2251373 MPS450-CO (base model plus cardiac-output simulation)

2251399 MPS450-FET (base model plus direct fetal/maternal ECG simulations with maternal heart rate, selectable fetal heart rate, and dynamic intrauterine pressure waveform [IUP])

2251386 MPS450-CO/FET (base model plus cardiac-output simulation and direct fetal/maternal ECG simulations with maternal heart rate, selectable fetal heart rate, and dynamic intrauterine pressure waveform [IUP])

medSim 300B

Patient Simulator

FLUKE® Biomedical

Key features

- 12-lead ECG simulation with independent output
- Four invasive BP channels including Swan-Ganz simulation
- Respiration and temperature
- 9 V dc battery and lead test
- ECG-performance testing including R-Wave detection
- Interactive defibrillation training
- 2-line x 20-character display
- RS-232 serial port

If your physiological-monitor testing requirements call for a full-featured, comprehensive instrument, the medSim 300B is your answer. Used by thousands of biomedical departments and many medical-device manufacturers around the world, this simulator delivers an entire array of parameters with ultimate flexibility.

Specifications

Arrhythmia selections	Supraventricular, premature, conduction, ventricular, and transvenous pacemaker
Programmable sequences	15 preprogrammed selections or user programmable
ECG parameters	Normal sinus rhythm Performance ST segments Arrhythmia selections
medSim 300B option 1	Fetal/maternal ECG and IUP Intra-aortic balloon assist pump Cardiac catheterization Cardiac Output Option Flow rates: 3 lpm to 7 lpm Curves: Normal, interrupt, slow, L/R shunt Trends: Avg = 5 l/min
Controller option	Direct waveform access
Premature beat selections	Manual: Push button insertions of one PVC, PAC, or PNC Automated: User-programmable PVC activity PVC types: 4 LV and RV foci PVC timing: Standard, early, and R-on-T PVC rate: 0 to 25/min or automated PVC-rate variance
Pacemaker	Amplitude: -700 mV to 700 mV Width: 0.1 ms to 2 ms
Defibrillator training	Three scenarios available

medSim 300B

Patient Simulator

FLUKE® Biomedical

Specifications

Blood pressure channels	**Channels** Four synchronized with normal sinus rhythm rates; tracks arrhythmia activity
	Transducer Exciter voltages: ac and dc compatible Sensitivity: 5 µV/V/mmHg and 40 µV/V/mmHg Calibrated rate: 80 BPM
Available selections	Static pressure
	Dynamic pressure: Art (120/80), LV (120/0), RA/CVP (15/10), RV (25/0), PA (25/10), PAW (10/2)
	Swan-Ganz procedure (manual)
	Triangle wave
Respiration	Normal physiological simulation Baseline impedance: 500 Ω to 2000 Ω Impedance variations: 0 Ω to 3 Ω Rates: 15 BrPM to 120 BrPM Apnea: Off, momentary, continuous, timed (12 sec and 32 sec)
Auxiliary features	I/E Ratio: 5/1, 4/1, 3/1, 2/1, 1/1
	Baseline shift: Delta impedance is reduced to 1/6 and shifted either positive or negative. The rate is changed to 120 BrPM for 12 sec/min.
	Ventilator simulation: 40 BrPM at fixed ratio
Artifact	ECG: 50 Hz, 60 Hz, muscle, and baseline wander. All or single leads. BP/respiration: Two pressure values
Temperature	Channel 1: Fixed at 37 °C (98.6 °F) Channel 2: 34 °C (86 °F), 37 °C (98.6 °F), 40 °C (104 °F) Hypothermia, hyperthermia, and spike
Power	Two 9 V dc alkaline batteries, battery eliminator
Dimensions (WxDxH)	17.8 cm x 25.4 cm x 7.6 cm (7 in x 10 in x 3 in)
Weight	1.6 kg (3.5 lb)

Optional accessories

2248554 Multipurpose Hard-sided Watertight Carrying Case

2199070 PC remote control interface cable (right-angle DIN to female DB25)

2199225 Patient Simulator to medTester interface cable (right-angle DIN to female DB25)

2199747 DS-A Datascope System 9 (DS-1 BP cable required) intra-aortic balloon assist sync cable

2199786 KT-A Kontron K200, KAAT (KT-1 BP cable required) intra-aortic balloon assist sync cable

2645641 HHC3 Handheld Controller

Temperature cables, blood-pressure cables, and cardiac output adapters: see web site for complete list

Included accessories

2243039 User Manual

2392826 Soft-sided Vinyl Carrying Case

2392729 ECG Electrode Adapter for Lead Test

2183983 120 V ac to 9 V Battery Eliminator

2183990 220 V ac to 9 V Battery Eliminator

Two 9 V Batteries

Ordering information

2247184 MS300B – US 120 V

2395133 MS300B – AUS 250 V

2395140 MS300B – DEN 250 V

2395157 MS300B – SHK 250 V

2395169 MS300B – ISR 250 V

2395178 MS300B – ITAL 250 V

2395184 MS300B – IND 250 V

2395191 MS300B – SWZ 250 V

2395207 MS300B – UK 250 V

PS420

Patient Simulator

FLUKE® Biomedical

The PS420 is a handheld, high-performance simulator for testing patient monitors.

Small enough to fit in a pocket, the handy PS420 features a wide variety of simulation capability, including a full range of ECG, respiration, blood pressure, temperature and cardiac output conditions. The tool includes 12-lead ECG, two-channel blood pressure simulation, 35 arrhythmia selections, pacemaker simulation as well as adult and pediatric normal sinus rhythms.

For convenient use, labeled hot keys on the keypad guide users to the most common settings.

Key features

- Compact, lightweight, pocket size
- Labeled hot keys for common settings
- 12-lead ECG
- Respiration and temperature selection
- Two-channel blood pressure simulation
- Optional cardiac output
- Adult and pediatric normal sinus rhythms
- 35 arrhythmia selections
- ECG performance waveforms
- ST segment levels
- ECG artifact
- Pacemaker simulation
- RS-232 serial port for computer control
- Battery operated

Specifications

ECG	
Normal rate	80 BPM
Selectable rates	30 BPM, 40 BPM, 60 BPM, 80 BPM, 100 BPM, 120 BPM, 140 BPM, 160 BPM, 180 BPM, 200 BPM, 220 BPM, 240 BPM, 260 BPM, 280 BPM, and 300 BPM
Accuracy	± 1 %
Output impedance	500 Ω, 1000 Ω, 1500 Ω, and 2000 Ω for leads I, II, and III
ECG amplitudes	0.5 mV, 1 mV, 1.5 mV, and 2 mV
Amplitude accuracy	± 2 % lead II
High-level output	1000x lead II
Adult or pediatric ECG waveform performance waveform	
Lead II square wave	2 Hz, 0.125 Hz
Pulse	30 BPM, 60 BPM, and 120 BPM, 60 ms pulse width
Sine wave	0.5 Hz, 4 Hz, 10 Hz, 40 Hz, 50 Hz, and 60 Hz (1 mV amplitude, lead II)
Triangle wave	2 Hz
ST segment analysis	
Elevated or depressed	-0.8 mV to +0.8 mV in 0.1 mV steps
Pacemaker	
Pacer spike	Amplitude: 2 mV, 4 mV, 8 mV, and 10 mV in lead II Accuracy: ± 5 %, Lead II
Pacer spike	Duration: 0.1 ms, 0.5 ms, 1 ms, 1.5 ms, and 2 ms Accuracy: ± 5 %
Functions	Asynchronous pacemaker Pacer non-function Pacer non-capture Demand occasional sinus Demand frequent sinus AV sequential

PS420

Patient Simulator

FLUKE® Biomedical

Specifications

Blood pressure	
Input/output impedance	350 Ω
Exciter input limit	± 10 V
Exciter input frequency range	DC to 4000 Hz
Transducer sensitivity	5 µV/V/mmHg or 40 µV/V/mmHg
Level accuracy	± 1 %, ± 1 mmHg
Static levels BP1	–10 mmHg, 0 mmHg, 50 mmHg, 100 mmHg, 150 mmHg, 200 mmHg, and 250 mmHg
Static levels BP2	–10 mmHg, 0 mmHg, 80 mmHg, 160 mmHg, 240 mmHg, 320 mmHg, and 400 mmHg
Channel selections:	Arterial 120/80, channel 1 and 2 Radial artery 120/80, channel 1 and 2 Left ventricle 120/00, channel 1 and 2 Right ventricle 25/00, channel 1 and 2 Central venous 15/10, channel 2 Pulmonary artery 25/10, channel 2 Pulmonary wedge 10/2, channel 2 Left atrium 14/4; automatic Swan/Ganz (every 20 sec) Manual swan/ganz (changes when entry is selected), channel 2 Synchronized with all normal sinus rates. Physiologically track all arrhythmia selection
Cardiac output (must have optional cardiac output adapter box p/n 2462200)	
Catheter type	Baxter edwards, 10 cc
Blood temperature	37 °C (98.6 °F) CO for 2 °C (35.6 °F): 3, 5, 7 l/min CO for 20 °C (68 °F): 3, 5, 7 l/min
Cal pulse	Of 1 °C for 1 sec; of Delta 402 Ω for 4 sec.
Computational constant	For 2 °C (35.6 °F) is 0.561; for 20 °C (68 °F) is 0.608
Left to right shunt	2 °C and 20 °C (35.6 °F and 68 °F)
Faulty injectate	2 °C and 20 °C (35.6 °F and 68 °F)
Accuracy	± 5 % Calibrated or uncalibrated cardiac output waves for 4 different CO values
Respiration	
Baseline impedance	500 Ω, 1000 Ω, 1500 Ω, and 2000 Ω, leads I, II, and III
Lead selections	LL or LA
Impedance variations	3 Ω, 1 Ω, 0.5 Ω, and 0.2 Ω
Accuracy	± 5 %
Rates	15 BPM, 20 BPM, 30 BPM, 40 BPM, 60 BPM, 80 BPM, 100 BPM, 120 BPM, and 0 BPM for apnea
Accuracy	± 2 %
Apnea	12 seconds, 22 seconds, 32 seconds, and continuous
Temperature	
Compatibility	YSI 400/700 series
Temperature	30 °C, 35 °C, 37 °C, 40 °C, and 42 °C (86 °F, 95 °F, 98.6 °F, 104 °F, and 107.6 °F)
Temperature simulation accuracy	± 0.25 °C

PS420

Patient Simulator

FLUKE® Biomedical

Specifications

Arrhythmias	Base rate of 80 BPM Sinus arrhythmia Atrial (PAC)* Missed beat* Atrial tachycardia Atrial flutter Nodal (PNC)* Nodal rhythm Supraventricular tachycardia PVC1 left ventricular focus* PVC 1 early, LV focus * PVC1 R on T, LV focus* PVC2 right ventricular focus* PVC2 early, RV focus* PVC2 R on T, RV focus* Multifocal PVCs* Atrial fibrillation coarse/fine PVCs 6/minute PVCs 12/minute PVCs 24/minute Frequent multifocal PVCs Bigeminy Trigeminy Pair PVCs* Run 5 PVCs * Run 11 PVCs* Ventricular tachycardia Ventricular fibrillation coarse/fine Asystole Conduction defects First degree Second degree Third degree Right bundle branch block Left bundle branch block *Will go to NSR ECG @ 80 BPM after completion
Artifacts	50/60 Hz Muscle Baseline Respiration
General	
Dimensions (LxWxH)	15.6 cm x 9.4 cm x 3.4 xm (6.1 in x 3.7 in x 1.3 in)
Weight	0.4 kg (0.9 lb)

Optional accessories

2462072 Universal Banana Adapter (17024)
2462189 Carrying Case, single pocket
2462177 Carrying Case, double pocket
2651740 Cardiac Output Adapter Box PS420 (17290)
2462295 BP Cable, unterminated PS420
2462312 Temperature Cable, unterminated PS420
2670242 PS420 Service and Calibration Manual
2462217 RS-232 Cable

Included accessories

2631808 PS420 User Manual (printed)
2631721 PS420 User Manual (electronic, CD)
2647372 Battery Eliminator 100 V ac to 240 V ac
9 V Battery

Ordering information

2631290 PS420 Patient Simulator

PS415

Patient Simulator

The PS415 is a high-performance multiparameter patient simulator for testing full-function monitors. Compact and lightweight, the handheld PS415 provides the versatile features and convenience to meet the needs of mobile field service technicians.

The device features 12-lead ECG output, two invasive blood-pressure channels, a wide range of arrhythmia selections, and respiration and temperature simulation. With its broad capability, the PS415 provides one of the best cost-benefit ratios among simulators on the market today.

Technicians control the PS415 with manual commands or onboard autosequences. A convenient pullout card provides quick menu access for all the manual simulations, and the front panel features an easy-to-use soft-key interface.

Key features

- Handheld
- 12-lead ECG simulations
- Wide range of arrhythmia selections
- Automatic or manual operation
- RS-232 port for computer control
- Two invasive blood pressure channels
- Respiration simulation
- Temperature simulation
- Battery operated
- Pullout card for quick menu access

Optional accessories

Temperature cables, blood-pressure cables, and cardiac output adapters: see web site for complete list

Normal sinus rhythm:	
Selectable rates	30 BPM, 40 BPM, 60 BPM, 70 BPM, 80 BPM, 90 BPM, 100 BPM, 120 BPM, 140 BPM, 150 BPM, 160 BPM, 180 BPM, 200 BPM, 210 BPM, 220 BPM, 240 BPM, 270 BPM, 300 BPM, and 350 BPM
Accuracy	± 1 %
Auto-step rate	30 BPM, 60 BPM, 80 BPM, 120 BPM, 180 BPM, and 240 BPM at 30-second intervals
Amplitude lead II	0.5 mV, 1 mV, 1.5 mV, and 2 mV
Amplitude accuracy	+5 % 2 Hz square wave at 1 mV p-p (Lead II)
Limb-lead impedance selections	500 Ω or 1000 Ω
V-lead impedance	1000 Ω
Accuracy	± 5 %
General information	
Power	9 V battery for 50-hour life or line-operated via battery eliminator
Output	7.7 V ac, 100 mA, unregulated
Display	2-digit LCD
Lead test	If the resistance is less than 1 kΩ, the display flashes at the rate of 4 Hz
Data interface	RS-232 compatible, bidirectional port
	5-pin DIN female connector
	Baud rate: 2400
Connector	2.5 mm, center (+)
Dimensions (LxWxH)	16 cm x 10.4 cm x 3.8 cm (6.3 in x 4 in x 1.5 in)
Weight	0.3 kg (0.8 lb)
Temperature	Operating: 15 °C to 35 °C (59 °F to 95 °F)
	Storage: 0 °C to 55 °C (32 °F to 131 °F)

Included accessories

2572338 Operating Manual
2183983 Battery Eliminator
2392729 Lead-test Adapter
2248505 Soft-sided Carrying Case

Ordering information

2558944 PS415 Patient Simulator

PS410

Patient Simulator

The PS420 is a handheld, high-performance simulator for testing patient monitors.

Small enough to fit in a pocket, the handy PS420 features a wide variety of simulation capability, including a full range of ECG, respiration, blood pressure, temperature and cardiac output conditions. The tool includes 12-lead ECG, two-channel blood pressure simulation, 35 arrhythmia selections, pacemaker simulation as well as adult and pediatric normal sinus rhythms.

For convenient use, labeled hot keys on the keypad guide users to the most common settings.

Key features

- Handheld
- 12-lead ECG simulation
- 12 arrhythmia selections
- Universal ECG jacks
- Auto sequencing of performance waveforms
- Battery operated

Specifications

Normal sinus rhythm: 12-lead with independent outputs referenced to RL	
Normal rate	80 BPM
Selectable rates	30 BPM, 40 BPM, 60 BPM, 80 BPM, 100 BPM, 120 BPM, 140 BPM, 160 BPM, 180 BPM, 200 BPM, 220 BPM, 240 BPM, 260 BPM, 280 BPM, and 300 BPM
Accuracy	± 1 %
Output impedance	940 Ω between leads
ECG amplitudes	0.5 mV, 1 mV, and 2 mV
Amplitude accuracy	± 2 % Lead II
High-level output	1000x Lead II
Waveforms	Adult or pediatric ECG waveform
ECG performance: Lead II	
Square wave	2 Hz and 0.125 Hz
Pulse	30 BPM, 60 BPM, and 120 BPM; 60 ms pulse width
Sine waves	0.5 Hz, 5 Hz, 10 Hz, 40 Hz, 50, and 60 Hz (1 mV amplitude only, lead II)
Triangle wave	2 Hz
ST Segment analysis	Elevated or depressed: -0.6 mV to 6 mV in 0.2 mV steps
Pacemaker	Pacemaker rhythm Pacer non-capture Pacer non-function Demand pacer with occasional sinus Demand pacer with frequent sinus A-V sequential
Artifact selection	50 Hz artifact 60 Hz artifact Muscle artifact Baseline artifact Respiration artifact

Optional accessories

2647372 Battery Eliminator 100 V ac to 240 V ac

2462189 Carrying Case, single pocket

2462177 Carrying Case, double pocket

2462072 10 Universal Banana Adapters

2670239 PS410 Service and Calibration Manual

Included accessories

2631742 PS410 User Manual (electronic, CD)

2631795 PS410 User Manual (printed)

2647372 Battery Eliminator 100 V ac to 240 V ac

9 V battery

Ordering information

2631276 PS410 Patient Simulator

PS400

Patient Simulator

The PS400 is a basic patient simulator for quality-assurance testing of ECG machines, monitors and telemetry units.

The lightweight, handheld device features 12-lead ECG output and a single high-level output. Technicians can use manual or automatic sequence modes to check low- and high-frequency response, linearity, gain, damping, and paper speed. The PS400 also includes 12 arrhythmia selections to check arrhythmia detection systems and teach health care workers how to recognize normal and abnormal heart rhythms.

Using the PS400 is easy. The user interface features a menu selector switch and a simple-to-use rotary knob for selecting waveforms.

Key features

- Handheld
- 12-lead ECG simulation
- 12 arrhythmia selections
- Universal ECG jacks
- Auto sequencing of performance waveforms
- Battery operated

Specifications

Waveforms	
ECG	30 BPM, 60 BPM, 120 BPM, 180 BPM, and 240 BPM
Square wave	2 Hz
Sine waves	10 Hz, 40 Hz, 50 Hz, 60 Hz, and 100 Hz
Arrhythmias	Atrial fibrillation Second-degree A-V block, type 1 Right-bundle-branch block Premature atrial contraction Premature ventricular contraction, early Premature ventricular contraction, R on T Multifocal PVCs Bigeminy Run of 5 PVCs Ventricular tachycardia Ventricular fibrillation Paced
Automated sequence	
Pulse	4 seconds
Sine waves	10 Hz, 40 Hz, 60 Hz, and 100 Hz
Triangle wave	2 Hz
Rate accuracy	± 0.5 %
Amplitudes	
Lead I	0.5 mV, 1 mV, 1.5 mV, and 2 mV
High-level output	0.25 V, 0.5 V, 0.75 V, and 1 V
Accuracy	± 2 %
Hz	2 Hz square wave at 2 mV (all leads)
General information	
Power	9 V alkaline battery for 200-hour life or line-operated via battery eliminator
	115 V ac or 230 V ac or 7.7 V dc, 100 mA, unregulated
	Connector, 2.5 mm center (+)
Dimensions (LxWxH)	13.2 cm x 9.9 cm x 3.6 cm (5.2 in x 3.9 in x 1.4 in)
Weight	0.4 kg (0.9 lb)
Operating temperature	15 °C to 35 °C (59 °F to 95 °F)
Storage temperature	0 °C to 55 °C (32 °F to 131 °F)

Optional accessories

2200116 High-level ECG Cable
2577801 Calibration Manual

Included accessories

2572345 Operating Manual
2248424 Soft-sided Carrying Case
2183983 Battery Eliminator
9 V Battery

Ordering information

2558932 PS400 ECG/ Arrhythmia Simulator

DataSim 6100

Patient Simulator

FLUKE® Biomedical

The DataSim 6100 offers six channels for generating ECG arrhythmias, blood pressure, and respiration. Features include a standard defibrillator training capability, along with an internal battery. All control keys and display prompts can be found on DataSim's convenient, handheld keypad, which is connected to the unit with a flexible, 6.1 m (20 ft) telephone-style cord for exceptional range of motion.

Critical Care Nurses, ACLS program instructors, and other clinical educators can use DataSim 6100 to generate an extensive range of simulations, from a simple normal sinus rhythm to a complex Swan-Ganz catheter insertion.

Key features

- Interface with Resusci-Anne™, Arrhythmia Anne™, and Chris Clean™
- Synchronized hemodynamic waveforms
- ECG/Respiration
- Manual PAC and PVC insertions
- Swan-Ganz procedure
- Expansion modules
- Training capabilities

Optional accessories

Blood pressure cables and personality modules: see web site for complete list

Specifications

Optional personality modules	• Pediatric ECG • Intracranial pressures • Advanced pacemaker • MCL1 atrials • MCL1 blocks • MCL1 ectopy/aberrancy • MCL1 set • Normal/diseased left heart • 12-lead set • ST segments • Intra-aortic balloon assist (interactive) • Cardiac output
Dimensions (WxDxH)	25.4 cm x 33 cm x 10.2 cm) (10 in x 13 in x 4.7 in)
Weight	3.2 kg (7.1 lb)

Included accessories

2242959 Operator's manual
2392337 LCD pendant controller
2184111 120 V ac battery charger (wall mount)
2184127 220 V ac battery charger (desktop, international version)

Ordering information

2247742 DATASIM6100 – US 120 V
2395218 DATASIM6100 – AUS 250 V
2395229 DATASIM6100 – DEN 250 V
2395234 DATASIM6100 – SHK 250 V
2395241 DATASIM6100 – ISR 250 V
2395252 DATASIM6100 – ITAL 250 V
2395265 DATASIM6100 – IND 250 V
2395276 DATASIM6100 – SWZ 250 V
2395283 DATASIM6100 – UK 250 V

HHC3

Hand Held Controller

The HHC3 Hand Held Controller is used to remotely operate medSim 300B, MPS450 and Marq III simulators in an easy and efficient manner. The HHC3 has all the output controls for these simulators and enables current simulator users, including hospital biomedical technicians and manufacturers, to simplify and standardize their testing, training, and preventive maintenance protocols. In addition, the HHC3 is an excellent device for biomedical training and demonstration use.

The HHC3 facilitates the direct selection of parameters for the Fluke Biomedical medSim 300B, MPS450, and Marq III simulators. The HHC3 uses flexible coiled cable to connect to a simulator. The HHC3 provides single-key commands, dual-key commands, factory-defined sequences and easy programming of user-defined sequences. Customers can use the HHC-Utility software to upload user-defined sequences from a PC and download the sequences to multiple controllers.

Key features

- Full-functionality control of the simulator, up to 6.1 m (20 ft) away
- Small and light weight
- Factory-defined sequences provided
- Easy programming for user-defined sequences
- Ability to run defined sequences repeatedly
- PC interface for simple configuration (utility)

Specifications

Power requirements	
medSim 300B	RS-232 cable supplies power to the HHC3
MPS450	Four alkaline AA batteries or battery eliminator
Marq III	Four alkaline AA batteries or battery eliminator
Battery power supply	
Four alkaline AA cells, non-rechargeable voltage	1.5 V dc x 4 V dc
Battery life (continuous use)	60 hours
Battery eliminator supply	Output voltage: 9 V dc
	Output current: 50 mA
General information	
Display	2 x 16 LCD, adjustable viewing angle
Controls	20 control keys and ON/OFF power switch
	Embossed keys in 4 x 5 matrix
Interface	RS-232 bidirectional interface
	Auto connect to simulator parameters
Altitude	Up to 2000 m
Dimensions (LxWxH)	3.6 cm x 8.1 cm x 16 cm (1.4 in x 3.2 in x 6.3 in)
Weight (with batteries)	0.36 kg (0.8 lb)

Optional accessories

2720054 Battery Eliminator

Included accessories

2671068 User Manual
2712829 medSim 300B Serial Interface Cable
2702279 MPS450 and Marq III Serial Interface Cable
2702287 Serial Interface Cable HHC3 to Computer
2671031 Utility Software
2671046 medSim 300B Instruction Card
2671022 MPS450 and Marq III Instruction Card
2242666 4-way Stop Cock Adapter
AA alkaline batteries (4)

Ordering information

2645641 HHC3 Hand Held Controller

PS320

Fetal Simulator

FLUKE® Biomedical

The PS320 simulates fetal and maternal ECG as well as uterine activity to test and troubleshoot fetal electronic monitors and to train clinical staff.

The unit is battery operated and small enough to fit in a pocket so mobile technicians and clinical instructors can take it anywhere.

The PS320 simulates several fetal parameters including twins, and it simulates a wide range of clinical scenarios for training labor-and-delivery staff in how to recognize normal and abnormal responses. An optional mechanical heart creates fetal heart sounds for testing fetal monitors' ultrasound cables and transducers.

PS320 offers an easy user interface providing a 2 x 16-character LCD display with adjustable contrast. The unit operates on a 9 V battery with low-battery monitoring or functions with the supplied battery eliminator.

Key features

- TOCO simulation
- Ultrasound simulation (including twins)
- Maternal ECG simulation
- Fetal ECG (tracks ultrasound #1)
- Internal (DECG) and external fetal ECG
- Uterine-activity selections
- Fetal beat-to-beat variability
- Periodic and non-periodic fetal ECG changes
- Arrhythmia selections
- Compact, lightweight, pocket-size plastic housing
- Battery operated with status indications
- Optional mechanical heart for ultrasound simulation

Specifications

Fetal ECG	
Static rates	30 BPM, 60 BPM, 90 BPM, 120 BPM, 150 BPM, 180 BPM, 210 BPM, and 240 BPM
ECG sensitivity	50 µV, 100 µV, 200 µV, 0.5 mV, 1 mV, and 2 mV
	US-1 tracks primary fetal ECG rates
	US-2 tracks secondary fetal activity for either independent "normal" or "twins" simulation
Fetal patterns **Note**: US-1 and fetal ECG track these selections. US-2 is in normal pattern, except during TREND #1 selection.	**Trend #1: Twin fetal patterns**
	Normal: Normal pattern Tachycardia: Tachycardia pattern Bradycardia: Bradycardia pattern Arrhythmias: Arrhythmia pattern Late deceler.: Late deceler. Early deceler.: Early deceler. Moderate deceler.: Moderate variable deceler. Acceler.: #1: Acceler. wave #1 Acceler.: #2: Acceler. wave #2 Sinusoidal (high): Sinusoidal pattern, large change Sinusoidal (low): Sinusoidal pattern, small change Severe var. deceler.: #1: Severe deceler. wave #2 Severe var. deceler.: #2: Severe variable deceler Prolonged deceler.: Prolonged deceler Biphasic deceler.: Biphasic deceler Exaggerated deceler.: Exaggerated deceler Non-uniform deceler.: Non-uniform deceler Var. deceler. (u): Variable deceler, "U" shaped Var. deceler. Tach: Variable deceler. with high-rate BPM Var. deceler. (v): Variable deceler. "V" shaped Var. deceler. (post): Variable deceler. post exaggerated Var. deceler.: Variable deceler. Deceler. (position): Variable deceler. with position changes Long deceler.: Long deceler. Compensatory acceler.: Compensatory acceler

PS320

Fetal Simulator

FLUKE® Biomedical

Specifications

Fetal ECG (continued)	
Variability selections (added to fetal ECG)	Absent variability, low variability, mild variability, high variability severe variability, long-term variability **Note**: These patterns repeat and toco channel will perform toco wave selected.
Optional mechanical heart	Provides a mechanical interface to the ultrasound transducer; can be connected to either ultrasound channels. This option, due to its power consumption, requires an ac adapter to be connected.
Maternal ECG	ECG static rates: 60 BPM, 80 BPM, 100 BPM, 120 BPM, 140 BPM, and 160 BPM ECG sensitivity: 0.5 mV, 1 mV, and 2 mV Pattern selected during Trend #1 selection
Uterine activity **Note**: Toco waveform selection not available during Trend #1.	Execute waveform: Start toco waveform Uterine wave Off: Stop toco waveform Analog 0 V TO 1 V: Analog range 0 V to 1 V (1 V = 100 mmHg) Uterine wave 0 to 25: Range of toco waveform Uterine wave 0 to 50: Range of toco waveform Uterine wave 0 to 100: Range of toco waveform Short duration: Toco waveform of short duration Normal duration: Normal duration of toco waveform Increased duration: Long duration of toco waveform Uterine level = Zero: Zero toco channel (automatic on power up) Uterine static +20: Increase toco static level by 20 mmHg (0 mmHg to 100 mmHg) Incr. resting tone: Resting tone increases Couping: 2 close toco waves Tripling: 3 close toco waves Uterine pressure sensitivity: 5 µV or 40 µV on power up
Important notes	• US-1 tracks the fetal ECG rates • US-2 is the second ultrasound channel with a normal fetal ECG pattern • On the fetal and maternal ECG, the fetal ECG is 1/4 the size of the maternal ECG
The PS320 turns on in the following state:	• Fetal ECG static rate @ 150 BPM • US-1 tracks @ 150 BPM • US-2 normal pattern • Pressure sensitivity @ 5 µV/mmHg • Pressure/Toco set to zero • Maternal ECG rate @ 80 BPM • ECG sensitivity @ 1 mV • Toco wave is normal duration @ 0 to 50 divisions (i.e. 0 mmHg to 50 mmHg)
Temperature	
Operating	15 °C to 35 °C (59 °F to 95 °F)
Storage	0 °C to 50 °C (32 °F to 122 °F)
General information	
Display	2-line x 16-character LCD with keypad
RS-232	Bidirectional interface, 9600 baud
Power	9 V battery/battery eliminator; low battery indication set at 6 V
Housing	Plastic case
Dimensions	15.6 cm x 9.4 cm x 3.4 cm (6.1 in x 3.7 in x 1.3 in)
Weight	0.4 kg (0.9 lb)

Optional accessories

2647372 Battery Eliminator 100 V ac to 240 V ac
2462177 Carrying Case, Double Pocket
2462478 Philips 50 Series—Ultrasound Cable
2462491 Agilent 50 Series TOCO—External Cable
2462528 Agilent 50 and 8040 Series TOCO—IUP Cable
2462469 Corometrics TOCO—External Cable
2462484 Corometrics—Ultrasound Cable
2462519 Corometrics TOCO—IUP Cable
2462528 HP/AG/PHILIPS IUP TOCO Simulation Cable
2462537 HP (8040 Series) Ultrasound Simulation Cable
2462543 HP (8040 Series) Ext TOCO Simulation Cable
2462555 **2462562** Oxford Ultrasound Simulation Cable 2.0 MHz (blue)
2462570 Oxford IUP Simulation Cable
2462217 RS-232 Cable
2651757 Mechanical Fetal Heart Probe
2462123 Mechanical Fetal Heart Cable
2670221 PS320 Service and Calibration Manual

Included accessories

2631717 User Manual (electronic, CD)
2631693 User Manual (printed)
2647372 Battery Eliminator Universal 90 V to 240 V
9 V battery

Ordering information

2583030 PS320 Fetal Simulator

Index 2

Pulse Oximeter Simulator

The Index 2 is the most versatile optical simulator for oximeters on the market today. This lightweight, portable tool includes preloaded manufacturers' R-curves and the ability to define other "makes" for most pulse oximeters.

Motion presets, player mode, transmission level control (TLC), and computer commands boost testing ability. The Index 2 can also be configured to include an optional electrical simulation feature with probe test. Optical and electrical simulations allow technicians to isolate problems quickly. The probe test identifies defective probes with quantitative test results.

Key features

- Portable
- 10 preloaded manufacturers' R-curves
- User-definable "makes" for most other manufacturers
- New R-curves for Masimo, Nonin and Philips Medical Systems (formerly Agilent/H-P) oximeters
- Six downloadable R-curve spaces available
- Simultaneous simulation of motion and arterial-oxygen levels
- Arterial wave-amplitude scale, calibrated in units of perfusion
- Tap/shiver motion simulations to explore the impact of motion
- RS-232 port for computer control
- Physiological finger for complete SpO_2 tests
- Electrical simulations with probe testing (optional)

Specifications

O_2	Range: 35 % to 100 %
	Resolution: 1 %
	Accuracy: 100 % to 75 %: ± 1 % ± accuracy of the pulse oximeter under test; 74 % to 50 %: ± 3 % ± the accuracy of the pulse oximeter under test; < 50 % unspecified
	Repeatability: ± 1 standard deviation
Rate	Range: 30 BPM to 250 BPM
	Resolution: 1 BPM
	Accuracy: 1 % ± 1 BPM
Pulse amplitude	Range: 0 % to 100 % of nominal pleth amplitude
	Resolution: 1 %
	Pulse amplitude is 20 % of maximum pass-through brightness
Probe test	Continuity/resistance test matrix: Measures all combinations of possible interconnections in an XX point matrix
	Range: 250 Ω to 150 kΩ
	Accuracy: ± 5 % of reading
LED/detector voltage test	Test format: Measures the voltage drop across Red LED, infrared LED, and the photo detector when the internally generated test signal is applied
	Test signal: Constant current source @ 1 mA
	Open circuit: 2.5 V max
	Measurement/display range: 0 V to 4 V
	Accuracy: ± 5 % of reading, 0.4 V to 4 V
Dynamic test	Test format: Photodetector/diode response to both the red and infrared light generated by the probe when pulsed by an internal test signal
	Test signal: Pulsed between the two LEDs; constant current level @ 1 mA
	Test results: Nominal range of 0 to 2000
Checksum	Sum of all locations in the program chip; for service use only
General information	
Display	2-line x 24-character super twist LCD
Battery life	At least four hours of continuous use
Dimensions (LxWxH)	45.7 cm x 40.6 cm x 22.9 cm (18 in x 16 in x 9 in)
Weight	4.5 kg (10 lb)

Standard probe and oximeter test cables

Optional accessories

2248568 Multipurpose Hard-sided Water-tight Carrying Case
2204282 Soft Vinyl Carrying Case
2200102 Interface Cable, medTester to Index 2 (RS-232; female DB25 to female DB9)

Included accessories

2226196 Operator's Manual
2521465 Battery Charger
Nellcor and Ohmeda Electrical Simulation and Probe Test Cable (2226007; 2225945; 2226018 and 2225938) for Index 2LFE only

Ordering information

INDEX2XLF Index 2_{XLF} (optical finger simulation)
INDEX2LFE Index 2_{XLFE} (optical finger and electrical simulation with probe test)

FLUKE®
Biomedical

ACCU LUNG

Portable Precision Test Lung

The ACCU LUNG Precision Test Lung is a lung simulator that presents a specific load comprised of a user-selectable compliance and resistance for the purpose of evaluating ventilator performance according to clinical expectation and manufacturers' specification. It is a portable unit that can be hung from a cart, the ventilator itself, or can be hand-held, thus presenting a "zero" footprint.

Key features

- Portable (light weight, small footprint)
- User-selectable compliance and resistance settings (three selections each)
- Calibrated accuracy for both resistance and compliance
- Complies with IEC standard for breathing-circuit connection
- Certified test lung for test system traceability to standards

Specifications

Environmental parameters	
Operating temperature	10 °C to 40 °C
Storage temperature	0 °C to 50 °C
Performance characteristics	
Static compliance	C50 0.5 l/kPa ± 20 % at 500 ml tidal volume
	C20 0.2 l/kPa ± 20 % at 500 ml tidal volume
	C10 0.1 l/kPa ± 20 % at 300 ml tidal volume
Resistance	Parabolic (orifice) resistor pressure drops selected from ASTM F1100 (K values), for inspiratory flows at 2, 1, and 0.5 l/s, respectively.
	Rp5 K 2.70 ± 20 % (equivalent orifice size = 8.48 mm) pressure drop 10.80 cmH_2O at 2 l/s
	Rp20 K 17.61 ± 20 % (equivalent orifice size = 5.31 mm) pressure drop 17.61 cmH_2O at 1 l/s
	Rp50 K 108.70 ± 20 % (equivalent orifice size = 3.37 mm) pressure drop 27.20 cmH_2O at 0.5 l/s
Physical characteristics	
Ventilator circuit connection	ISO 22 mm female
Warranty specifications	15 month extended warranty on all parts and labor with the following limitations: a) All rubber parts (including bellows made from Hypalon®) are warranted to be free from defects at the time of delivery b) Springs are considered limited lifecycle parts and are expected to survive 1 x 10^6 cycles
Dimensions (LxWxH)	27.9 cm x 21.6 cm x 10.2 cm (11 in x 8.5 in x 4 in)
Weight	1.8 kg (4 lb)

Included accessories

Operator's/Service Manual
2397628 Soft-sided Carrying Case

Ordering information

2387318 ACCU LUNG Precision Test Lung

VT MOBILE

Portable Gas Flow Analyzer

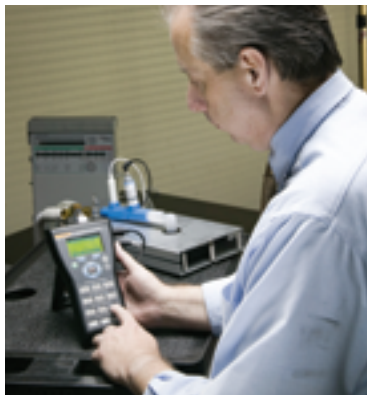
The VT MOBILE is a compact and portable general purpose gas-flow analyzer designed to meet the needs of the traveling technician or engineer. This versatile tool evaluates performance of a wide variety of medical gas-flow/pressure devices and measures 16 ventilator parameters.

EC.6.20 now requires completion of 100 % of life-support device preventive maintenance every year. VT MOBILE can help you meet those requirements.

The base unit measures high- and low-flow ranges, volume, pressure, and oxygen concentration. Additionally, the temperature and relative humidity option can be ordered separately to ensure the most accurate gas-flow measurements.

Key features

- Bidirectional flow (high- and low-flow ranges), volume, vacuum, pressure and oxygen concentration measurements
- 16 ventilator parameter measurements
- Trending and statistical analysis of all measured values
- Onboard graphical display
- Portable and compact
- RS-232 for computer control
- Memory for storing results
- VT for Windows PC software
- Optional sensor assembly for temperature and humidity measurements



VT MOBILE Tilt Stand in low-tilt position

Specifications

Display	64 pixels x 128 pixels, reflective LCD, blue on yellow
Gas types	Air, N_2, N_2O, CO_2, O_2, N_2O bal O_2, N_2 bal O_2
Battery power supply	Input voltage range: 9 V dc
	Battery life: > 7 hours
Dimensions (LxWxH)	20 cm x 10 cm x 3.8 cm (8 in x 4 in x 1.5 in)
Weight	0.45 kg (1 lb)

	Low-pressure port	High-pressure port	Airway pressure
Maximum applied pressure	5 psi	125 psi	5 psi
Operating ressure	-20 cmH_2O to 120 cm H_2O	-2 psi to 100 psi	-20 cmH_2O to 120 cmH_2O
Span accuracy	+2 % of reading or 1.5 mmHg	+2 % of reading or +0.2 psig	+2 % of reading or +0.5 cmH_2O

Product comparison chart

Model	VT MOBILE	VT PLUS HF
Flow range	25 to 200 l/min (high flow sensor) 0 to 25 l/min (low flow sensor)	25 to 300 l/min (high flow channel) 0 to 25 l/min (low flow channel)
Features and benefits	Portable, battery-powered, all ranges of pressure, flow, temperature, and RH measurement, easy-to-use	Bench-top or portable, line-powered, all ranges of pressure, flow, easy-to-use
	16 ventilator parameters on three screens	21 ventilator parameters on one screen
	On-screen pressure, flow and volume waveforms	On-screen pressure, flow and volume waveforms
	Ventilator and non-ventilator flow measurements	Ventilator and non-ventilator flow measurements
	On-board memory for temporary test result storage	On-screen pressure, flow and volume waveforms
	–	Special modes for High Frequency ventilators and RT-200 emulation
	Compatible with VT for Windows® PC software (standard accessory)	Compatible with VT for Windows® PC software (standard accessory)

VT MOBILE

Portable Gas Flow Analyzer

FLUKE® Biomedical

Specifications

	High-flow port	Low-flow port
Operating flow range	± 200 lpm	+25 lpm
Accuracy	± 3 % of reading or ± 2 % of range	+3 % of reading or +1 % of range
Floor for absolute accuracy	25 lpm	3 lpm
Low-flow dropout	2.5 lpm	0.24 lpm
Volume range	> ± 60 l	+60 l
Tidal volume accuracy	± 3% of reading or ± 20 ml, whichever is greater	+3 % of reading or +2 ml

	Oxygen measurement	Barometric pressure measurement
Range	0 % to 100 %	8 psia to 18 psia (400 mmHg to 900 mmHg)
Accuracy	+2 % full-scale output	+2 % of reading
Sensor technology	Galvanic fuel cell	–
Calibration	Allows user calibration using air and 100 % O_2	Not required; however, device allows user calibration of offset

Notes:

• Automatic partial pressure compensation for barometric and airway pressure changes.

• Recommended interval for changing oxygen sensor is one year. However, sensor may last longer. During user calibration of the sensor, the VT MOBILE can detect if the sensor needs to be replaced.

Secondary parameter-accuracy specifications	Resolution	Range	Accuracy
Inspiratory and expiratory tidal volume	0.1 ml	> 10 l	± 3 % expiratory minute volume
	0.001 lpm	0 l to 60 l	± 3 %
Breath rate	0.1 BPM	2 BPM to 150 BPM	± 1 % inspiratory-to-expiratory time ratio (I:E ratio)
	0.01 Range: 0.25 to 9.99	–	± 2 % or 0.1 s
Peak inspiratory pressure	0.1 cmH_2O	± 120 cmH_2O	+3 % or 1 cmH_2O
Inspiratory pause pressure	0.1 cmH_2O	± 120 cmH_2O	+3 % or 1 cmH_2O
Mean airway pressure	0.1 cmH_2O	+80 cmH_2O	+3 % or 0.5 cmH_2O
Positive-end expiratory pressure (PEEP)	0.1 cmH_2O	-5 cmH_2O to 40 cmH_2O	+3 % or 0.5 cmH_2O
Peak expiratory flow	0.01 lpm	0 lpm to 150 lpm	± 3 % or 2 % of range
Temperature	0.1 °C	0 °C to 50 °C	± 1 °C
	Units: °C, °F, °K		
Humidity	0.1 %	0 % to 100 %	± 5
RS-232 serial communications	4-pin modular connector located on upper-left side of panel. RS-232 compatible with the VT Plus for Windows software application (version 2.01.00 or higher.)		

Environmental specifications	
Operating temperature	10 °C to 40 °C (50 °F to 104 °F)
Storage temperature	-25 °C to 50 °C (-13 °F to 122 °F)
Operating humidity	0 % to 80 % non-condensing at temperatures to 31 °C, decreasing linearly to 50 % relative humidity at 40 °C (104 °F)
Storage humidity	0 % to 95 % non-condensing
Operating barometric	7 psia to 18 psia
Storage barometric	787.9 mmHg to 522.7 mmHg (-1000 ft to 10000 ft)

Optional accessories

2548405 Accessory Kit
2548431 High-flow Sensor
2548422 Low-flow Sensor
2548303 High-pressure Adapter, male to male
2548315 High-pressure Adapter, male to female
2454175 Low-pressure Adapter
2541622 Temperature and RH Sensor, Cable and T Adapter, 6 ft
2457028 Oxygen-Sensor Cable, 6 ft
2448051 T Adapter for Oxygen Sensor
2558269 VT for Windows® PC Software
2075257 Serial Communications Cable (RS-232), 6 ft
2547455 Power adapter, universal (USA and international)
2551236 Soft Carrying Case
2387318 ACCU Lung Portable Precision Test Lung

Included accessories

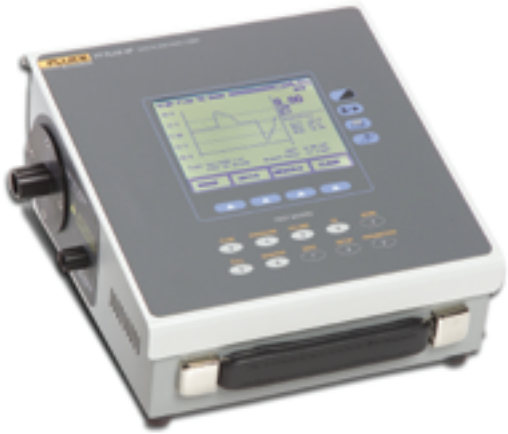
2548405 Accessory Kit
2544903 CD, includes: quick-reference card, operators manual, getting-started manual, other matter
2544892 Getting Started Manual
2544630 Quick Reference Card
2548431 High-flow Sensor
2548422 Low-flow Sensor
2548315 High-pressure Adapter, Male to Female
2454175 Low-pressure Adapter
2457028 Oxygen-sensor Cable, 6 ft
2448051 T Adapter for Oxygen Sensor
2448801 Oxygen Sensor
614487 9 V dc Battery (alkaline)
2075257 Serial Communications Cable (RS-232), 6 ft
2558269 VT for Windows® PC Software
2551236 Soft Carrying Case

Ordering information

2427911 VT MOBILE US, English
2553550 VT MOBILE FRA, French
2542531 VT MOBILE DEU, German
2542546 VT MOBILE ITAL, Italian
2542554 VT MOBILE SPAN, Spanish
2553610 VT MOBILE JPN, Japanese
2553605 VT MOBILE CHI, Chinese

VT PLUS HF

Gas Flow Analyzer



The VT PLUS HF is Fluke Biomedical's premier general-purpose gas flow analyzer. In addition, special display modes and bidirectional flow make it perfect for fully and efficiently testing both conventional mechanical ventilators and high-frequency ventilators. EC.6.20 now requires 100 % completion of scheduled life-support device preventive maintenance every year, and VT PLUS HF can help meet those requirements. Multiple special-function tests make troubleshooting quick and efficient.

Learning to use the VT PLUS HF is simple. Technicians control the unit using the VT PLUS HF user-friendly command system, or, if they're familiar with the RT-200, they can switch to a special control mode that uses RT-200-style commands.

Key features

- Bidirectional flow, pressure, volume, and oxygen concentration, and pressure measurements
- Low- and high-pressure, and flow measurement capability
- Special HF mode—up to 900 BPM (15 Hz)
- RS-232 and printer ports
- Included Windows-compatible graphics software
- All 21 ventilator parameters displayed at once on one screen
- Operation by user-friendly VT PLUS HF command mode or special RT-200 command mode
- Minimum, maximum, average, absolute, and graph for all parameters
- Multiple special-function tests for efficient troubleshooting

Optional features

- Operation with a variety of precision test lungs available from Fluke Biomedical to complete a fully NIST-traceable ventilator testing system

Specifications

	Low-pressure	High-pressure	Airway-pressure
Range	± 500 mmHg (10 psi)	± 100 psi	± 120 cmH_20
Accuracy	± 0.5 % of reading or ± 1.5 mmHg, whichever is greater	± 1 % of reading or ± 0.1 psig, whichever is greater	± 0.75 % of reading or ± 0.5 cmH_20, whichever is greater
Note	Fluid pressure may be applied to the positive port; however, fluids should be kept from entering the pressure port by using a suitable length of connection tubing.		Airway pressure is internally tapped off the proximal-flow sensor port, which is the port closest to the exhaust port on the VT PLUS HF

	Low-flow	High-flow
Flow range	-25 lpm to 25 lpm	-300 lpm to 300 lpm
Accuracy	± 2 % of reading or ± 1 % of range, whichever is greater	± 2 % of reading or ± 2 % of range, whichever is greater
Low-flow dropout	0.01 lpm	–
High-flow dropout	–	25 lpm
Volume range	> ± 60 l	> ± 60 l
Notes	• Tidal-volume accuracy: ± 3 % of reading or ± 2 ml, whichever is greater • Volume accuracy tested to 1 liter • Flow accuracy is specified for dry air or oxygen • Below 3.0 lpm, measurement accuracy is obtained by allowing the VT PLUS HF to fully warm up or manually zeroing before reading or documenting measurement.	• Tidal-volume accuracy: ± 3 % of reading or ± 10 ml, whichever is greater • Volume accuracy tested to 7 liters • Flow accuracy is specified for dry air or oxygen

General	
Dimensions (LxWxH)	25.4 cm x 25.4 cm x 12.7 cm (10 in x 10 in x 5 in)
Weight	4.53 kg (10 lb)

VT PLUS HF standard accessories

VT for Windows PC Software (PC not included)

VT PLUS HF

Gas Flow Analyzer

FLUKE® Biomedical

Specifications

Ventilator parameter	Resolution	Range	Accuracy
Inspiratory and expiratory tidal volume	0.1 ml	As specified in high-flow/low-flow specification	
Expiratory minute volume	0.001 lpm	0 L to 60 L	± 3 %
Breath rate	0.1 BPM	0.5 BPM to 150 BPM	± 1 %
Inspiratory-to expiratory time ratio (I:E ratio)	0.01	1:200 to 200:1	± 2 % or ± 0.1 s
Inspiratory time	0.01 s	0 s to 60 s	± 1 % or ± 0.02 s
Expiratory time	0.01 s	0 s to 90 s	± 1 % or ± 0.01 s
Peak inspiratory pressure	0.1 cmH_2O	± 120 cmH_2O	± 3 % or ± 1 cmH_2O
Inspiratory pause pressure	0.1 cmH_2O	± 120 cmH_2O	± 3 % or ± 1 cmH_2O
Mean airway pressure	0.1 cmH_2O	± 80 cmH_2O	± 3 % or ± 0.5 cmH_2O
Positive end-expiratory pressure (PEEP)	0.1 cmH_2O	-5 cmH_2O to 40 cmH_2O	± 3 % or ± 0.5 cmH_2O
Inspiratory hold time	0.01 s	0 s to 60 s	± 1 % or ± 0.1 s
Expiratory hold time	0.01 s	0 s to 90 s	± 1 % or ± 0.1 s
Peak expiratory flow	0.01 lpm	0 lpm to 300 lpm	± 3 % or ± 2 lpm
Peak inspiratory flow	0.01 lpm	0 lpm to 300 lpm	± 3 % or ± 2 lpm
Lung compliance	0.1 ml/cmH_2O	0 ml/cmH_2O to 150 ml/cmH_2O	± 5 % or ± 5 ml/cmH_2O
	Inspiratory pause time: > 0.5 s		
Flow bias	0.01 lpm	0 lpm to 30 lpm	± 2 % or ± 0.5 lpm
	Expiratory pause time: > 0.5 s		

Optional accessories

2222822 Soft Vinyl Carrying Case for VT PLUS HF

2248587 Hard-sided Protective Carrying Case for VT PLUS HF (limited to stock on hand)

2397628 Soft-sided Carrying Case for ACCU LUNG

Test Lungs

2387318 ACCU LUNG Portable Precision Test Lung (with Soft-sided carrying case for ACCU LUNG, model 2397628)

2251049 Michigan Instruments Non-instrumented Single-adult Test Lung

2251008 Michigan Instruments Non-instrumented Dual-adult Test Lung

2251013 Michigan Instruments Non-instrumented Adult/Infant Test Lung

2213774 Siemens 190 Test Lung

Parabolic Airway Resistors (for use with Michigan Instruments test lungs)

2212830 Parabolic Airway Resistor: RP5

2212934 Parabolic Airway Resistor: RP10

2212848 Parabolic Airway Resistor: RP20

2212853 Parabolic Airway Resistor: RP50

2212918 Parabolic Airway Resistor: RP200

2213140 Parabolic Airway Resistor: RP500

Printers

2248762 Printer 110 V, Citizen IDP 3110

2719653 Printer 220 V, Citizen IDP 3110

2238072 Parallel Printer Cable, D25M-C36M

Accessory Kit Parts

2133712 Filter, External (bacterial), 1 each

2391777 Adapter, DISS O2 nut and nipple with 1/4 in I.D. hose barb, 1 each

2133310 Tubing Adapter, Directional (15 mm OD x 15 mm OD), 2 each

2133305 Tubing Adapter (22 mm OD x 22 mm ID), 2 each

2133291 Tubing Adapter (22 mm OD x 22 mm OD), 2 each

2133269 Tubing Adapter (15 mm OD x 22 mm OD), 2 each

2133278 Tubing Adapter (15 mm OD x 15 mm OD), 2 each

2133284 Tubing Adapter (15 mm ID x 15 mm OD), 2 each

2133322 Tubing Adapter, Narrow Bore, 2 each

2213679 Barb (luer lock – male to 1/89 in ID tubing), 2 each

2133240 Tubing Adapter (1/4 in NPT male to 1/8 in ID tubing barb fitting), 2 each

2133202 Tubing Adapter (luer lock 1/16 in to bulkhead connection), 2 each

Included accessories

2137275 Operator's Manual

2392054 VT for Windows® PC Software

2238659 Serial Cable

2133387 Tilt Stand

Power cord (country specific)

2131367 Accessory Kit (includes 16 accessories)

Ordering information

2128272 VT PLUS HF-US120

2399376 VT PLUS HF-AUS250V

2399383 VT PLUS HF-SHK250V

2399390 VT PLUS HF-UK250V

Premium Precision Ventilator Test Kit

(VT PLUS HF Gas Flow Analyzer; and ACCU LUNG portable precision test lung)

2387329 VT PLUS HF/ACCU LUNG-US

2425682 VT PLUS HF/ACCU LUNG-AUS

2425694 VT PLUS HF/ACCU LUNG-SHK

2425701 VT PLUS HF/ACCU LUNG-UK

VT-Plus Upgrades

(adds HF capability and RT-200 mode)

2240945 VT PLUS HF hardware and firmware factory service upgrade (for units lower than hardware v1.01.01; additional flat-rate charge required for factory service/calibration)

DPM4

Parameter Tester

The versatile DPM4 tests and calibrates flow and pressure generators used in many medical devices. With several measurements combined in a single, handheld device, the DPM4 provides a cost-effective solution, eliminating the need for multiple test meters.

The DPM4 features a menu-driven interface for simple operation and an easy-to-read screen that displays multiple parameter measurements simultaneously.

Key features

All models

- Palm size
- High accuracy
- Differential pressure, vacuum, and temperature measurements
- Multiple user-selectable units of measurement
- Simultaneous display of multiple parameter measurements
- Leak-detection/leak-rate calculation
- RS-232 for computer control

Model 1G

- Pressure measurements in -700 mmHg to 5000 mmHg range

Model 1H

- Pressure measurements in -350 mmHg to 350 mmHg range

Model 2G

- Barometric pressure, flow, and humidity measurements
- Pressure measurements in -700 mmHg to 5000 mmHg range

Model 2H

- Barometric pressure, flow, and humidity measurements
- Pressure measurements in -350 mmHg to 350 mmHg range

Specifications

Model 1H or 2H

Pressure measurement	
Operating range	-350 mmHg to 350 mmHg
Accuracy	± 0.3 % of range

Model 1G or 2G

Pressure measurement	
Operating range	-700 mmHg to +5000 mmHg
Accuracy	± 0.3 % of range for temperatures from 21 °C to 25 °C and relative humidity from 30 % to 70 % ± 0.3 % of range;
	± 0.02 % of range per degree °C for temperatures < 21 °C or > 25 °C with relative humidity from 30 % to 70 %
Temperature measurement	
Operating range	-40 °C to 200 °C (-40 °F to 392 °F)
Accuracy	± 2 % of reading to ± 0.5 % from -40 °C to 200 °C

Product comparison chart

Model	**DPM1B**	**DPM2Plus**	**DPM4-1G**	**DPM4-1H**
Pressure measurement range	-300 mmHg to +300 mmHg	-698 mmHg to +802 mmHg -949 cmH_2O to +1090 cmH_2O -374 inH_2O to +429 inH_2O -13.50 psi to +15.50 psi -13.50 psi to +100.00 psi	-700 mmHg to +5000 mmHg	-350 mmHg to +350 mmHg
Pressure generation range	-300 mmHg to +300 mmHg	–	–	-300 mmHg to +300 mmHg
Gas/liquid operation	Both	Both	Gas only	Gas only
Dimensions (LxWxH)	14.6 cm x 15.9 cm x 3.8 cm (5.8 in x 3.6 in x 1.5 in)	14.6 cm × 9.14 cm × 4.83 cm (5.75 in x 3.6 in x 1.9 in)	34 mm x 94 mm x 156 mm (1.3 in x 3.7 in x 6.1 in)	34 mm x 94 mm x 156 mm (1.3 in x 3.7 in x 6.1 in)
Weight	260 g (10 oz)	Not specified	0.4 kg (0.9 lb) with battery	0.4 kg (0.9 lb) with battery
Power	One 9 V alkaline battery	One 9 V battery, NEDA 6LR61, IEC 1604A	9 V dc; > 7 hours of continuous use	9 V dc; > 7 hours of continuous use
	60 hours of continuous use	60 hours of continuous use	External power supply Output voltage 12 V to 15 V Output current: 1.2 A	External power supply Output voltage 12 V to 15 V Output current: 1.2 A

DPM4

Parameter Tester

FLUKE® Biomedical

Specifications

Temperature Probe PT-100 and PT-1000

PT-100 Operating range	-200 °C to 750 °C (-328 °F to 1382 °F)
Accuracy	± 0.13 °C @ 100 °C (0.23 °F at 212 °F) ± 0.1 °C @ 0 °C (0.18 °F @ 32 °F) ± 0.2 °C @ 100 °C (0.36 °F @ 212 °F)
PT-1000 operating range	-200 °C to 750 °C (-328 °F to 1382 °F)
Accuracy	0.3 °C (0.5 °F) barometric pressure

Model 2G or 2H

Note: It is possible to compensate for the sea level and calibrate for offsets.

Pressure measurement	
Operating range	380 mmHg to 900 mmHg
Accuracy	± 2 % of reading
Relative humidity **Note**: An integrated sensor in the instrument determines relative humidity measurements.	
Operating range	12 % RH to 95 % RH
Accuracy	± 3.5 % of reading ± 2 % @ 25 °C (77 °F)
Gas flow **Note**: Gas flow measures with an embedded sensor with 11 calibration points to compensate non-linearity: calibration constants are stored in firmware.	
Operating range	-750 ml/min to 750 ml/min
Accuracy	± 1 % of range or ± 5 % of reading

Model 1G, 1H, 2G and 2H

Temperature	
Operating	15 °C to 35 °C (59 °F to 95 °F)
Storage	0 °C to 50 °C (32 °F to 122 °F)
General information	
Power	9 V alkaline battery RG9 or battery eliminator
Battery life	> 7 hours
Dimensions (LxWxH)	156 mm x 94 mm x 34 mm (6.1 in x 3.7 in x 1.3 in)
Weight	0.4 kg (0.9 lb) with battery

Model	**DPM4-2G**	**DPM4-2H**
Pressure measurement range	-700 mmHg to +5000 mmHg	-350 mmHg to +350 mmHg
Pressure generation range	–	–
Gas/liquid operation	Gas only	Gas only
Dimensions (LxWxH)	1.3 in x 3.7 in x 6.1 in (34 mm x 94 mm x 156 mm)	1.3 in x 3.7 in x 6.1 in (34 mm x 94 mm x 156 mm)
Weight	0.4 kg (0.9 lb) with battery	0.4 kg (0.9 lb) with battery
Power	9 V dc; > 7 hours of continuous use	9 V dc; > 7 hours of continuous use
	External power supply Output voltage 12 V to 15 V Output current: 1.2 A	External power supply Output voltage 12 V to 15 V Output current: 1.2 A

Optional accessories

2647372 BE-UNVSL-IEC20C14 Battery Eliminator
2461910 PT-100 Temperature Probe
2461922 PT-1000 Temperature Probe
2461905 Expansion Chamber
2461946 Tubing Kit with Inflation Bulb
2462335 RS-232 Cable (optional)

Included accessories

2572323 User Manual
2462177 Soft-sided Carrying Case
2461946 Tubing Kit

Ordering information

2583121 DPM4 Parameter Tester Model 1H
2631330 DPM4 Parameter Tester Model 1G
2637760 DPM4 Parameter Tester Model 2H
2637772 DPM4 Parameter Tester Model 2G

DPM1B

Pneumatic Transducer Tester

The DPM1B pneumatic transducer tester is designed to measure the positive and negative pressures of medical devices in either liquid or gaseous form, and to generate pressure within the ± 300 mmHg range to assist in repair and quality control.

Key features

- Battery operated
- Generates and measures positive or negative pressures
- Operates with gas and liquid
- Troubleshooting with 1 % accuracy

Specifications

Pressure measurement	
Operating range	± 300 mmHg
Pressure generation range	± 300 mmHg
Accuracy	± 1 % of reading or ± 1 mmHg
Units of measure	mmHg
Environmental requirements	
Operating temperature	10 °C to +40 °C (+50 °F to +104 °F)
General information	
Display/control	0.5 in LCD with LO BATT indication
Power	9 V alkaline battery
Weight	260 g (10 oz)

Included accessories

2572314 User Manual
2242666 3-way Stop Cock Adapter
614487 9 V alkaline battery

Ordering information

224977 DPM 1B Pneumatic Transducer Tester

DPM2Plus

Pressure Meter

The DPM2Plus Pressure Meter is designed to measure the positive and negative pressures of medical devices in either liquid or gaseous form to assist in repair and quality control.

When coupled with the optional Parabolic Flow Adapter accessory, the displayed pressure can be interpreted, using the look up table supplied with the parabolic flow adapter to determine flow from medical devices.

Key features

- Five selectable pressure ranges
- Voltage output to drive a recorder for assessing electronics of pressure-measurement circuit
- Capability to test ophthalmology equipment, lasers, dialysis machines, automatic tourniquets, drainage devices, IV pumps, pressure gauges, ventilators, diagnostic, surgical suction devices, and more
- Air or liquid measurement

Specifications

Operating range	-698 mmHg to 802 mmHg -949 cmH_2O to 1090 cmH_2O -374 inH_2O to 429 inH_2O -13.50 PSI to 15.50 PSI -13.5 PSI to 100 PSI
Accuracy	± 1 % of range
Units of measure	mmHg cmH_2O PSI inH_2O
Temperature operating requirements	0 °C to 30 °C (32 °F to 86 °F)
Display/control	0.5 in LCD with LO BATT and negative polarity indication
Data outputs	V/psi (all ranges except 100 psi) 0.01 V/psi for 100 psi range
Power	9 V alkaline battery
Dimensions (LxWxH)	14.61 cm x 9.14 cm x 4.83 cm (5.75 in x 3.6 in x 1.9 in)

Optional accessories

2242653 Catheter Adapter
2242XXX Parabolic Flow Adapter

Included accessories

2572323 Operator's Manual
2242653 Catheter Adapter
2249768 One 9 V Alkaline Battery

Ordering information

2249768 DPM2Plus Universal Pressure Meter

Ansur

Test Automation Software

How well do your PM Inspection and post-repair performance-testing processes eliminate sources of human error?

Wish that all technicians would document results the same way?

Do you have enough time to complete all PM Inspection and repair work on your shelf?

Ansur offers a solution:

Repeatability—Creates standard work since everyone tests the same way every time

Quality—Can automatically configure and collect data from the compatible test devices to minimize human error and save time

Productivity—Ensure that the amount of time required to perform testing is uniform and therefore predictable

Ansur test automation system collects all the observe-and-record manual entries as well as automated measurement collection from compatible simulators and performance analyzers from Fluke Biomedical.

Key features

- General framework software for performing all types of tests and inspections with ability to add test-device-specific plug-in applications as needed
- Remote control of Fluke Biomedical testers, and acquisition of test results via RS-232
- Manual/visual tests, performance tests, and electrical-safety tests all executed in one procedure
- Test-procedure and test-result files stored in industry-standard XML format
- Interface capability with some equipment management systems and computerized maintenance management systems
- Ready-to-use or customized test templates make creating standard work easy

Specifications

PC requirements	64 MB RAM
	50 MB unused hard drive space for software
	IBM PC/XT compatable Pentium 266 MHz or faster processor
	Hard drive space for result and template files
	32-bit Microsoft Windows® operating system (2000/XP)
	RS-232 ports or USB-RS-232 adapter
Other requirements	License key for each Fluke Biomedical or Metron simulator/analyzer plug-in (accesses full functionality of Ansur and its plug-ins)
	One or more Ansur-compatible Fluke Biomedical or Metron simulators/analyzers (ensures best results for minimizing human error and opportunity for best productivity)

Ordering information

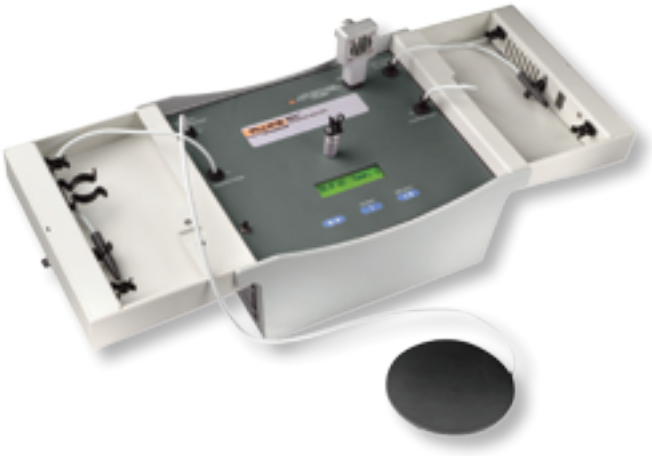
2462982 Ansur Test Executive

Plug-in varieties available:
Purchase the modules you need, and then add modules as you acquire new Fluke Biomedical analyzers and simulators.

2461802 QA-ES PLUG-IN (ESU)
2461979 QA-IDS/lagu PLUG-IN (Infusion)
2461775 QA-40M/45 PLUG-IN (Defib)
2817641 IMPULSE 4000 PLUG-IN LICENSE (Defib)
2817226 QED 6 Plug-in License (Defib)
3091370 Impulse 7000 Plug-in License (Defib)
2463002 QA-ST PLUG-IN (Electr Safety)
2463016 QA-90 PLUG-IN (Electr Safety)
2556755 ESA601 PLUG-IN (Electr Safety)
3116463 ESA620 Plug-in (Electr Safety)
2755836 BP PUMP 2 PLUG-IN (NIBP)
2462644 QA-1290 PLUG-IN (NIBP)
2462024 QA-VTM PLUG-IN (Vents and Anesthesia)

INCU™

Incubator Analyzer



Faulty incubator controls lengthen hospital stays, and drive up healthcare costs, making thorough incubator testing essential.

Designed around AAMI and IEC standards that specify incubator and radiant warmer sound levels and thermal characteristics, the INCU simultaneously measures airflow, relative humidity, sound, and four independent temperatures. Adjustable measurement intervals let technicians configure the unit to meet their facilities' testing requirements. Technicians are free to do other work while the device collects and records data.

INCU software lets technicians upload setup parameters and download the test results to a PC file, or print the data in reports with full-color charts and graphs.

Key features

- Simultaneous measurement of humidity, airflow, sound, and 4 independent temperatures
- 24-hour continuous testing (battery); 35-hour continuous testing (main power)
- Battery operated
- Adjustable measurement intervals
- Compatible with closed, forced-convection incubators and open infant warmers
- Stand-alone measurement or automated testing with PC
- Windows® compatible INCU software for easy data collection, analysis, and documentation
- Numerical and full-color graphical reports

Specifications

Power supply	
Input voltage range	100 V ac to 240 V ac
Input frequency range	47 Hz to 63 Hz
Battery	Rechargeable sealed lead-acid type NP7-6 YUASA, 6 V, 7 Ah; operates for 24 hours continuously; low-battery alert
Sound level	
Measuring range	30 dbA to 80 dbA
Resolution	0.1 dbA
Accuracy	+5 dbA @ 30 dbA to 80 dbA
Relative humidity (without condensation)	
Measuring range	0 % to 100 % RH, non-condensing
Resolution	0.1 % RH
Accuracy	± 5 % RH for 0 % to 90 % RH at 77 °F to 104 °F (25 °C to 40 °C) or ± 5.3 % RH for 0 % to 100 % RH at 77 °F to 104 °F (25 °C to 40 °C)
Temperature measurement	
Measuring range	5 °C to 70 °C (41 °F to 158 °F)
Resolution	0.1 °C (32 °F)
Accuracy	+0.5 °C (+0.9 °F) +1 LSB of range from 25 °C to 40 °C (77 °F to 104 °F)
Airflow	
Measurement range	0.1 m/s to 0.7 m/s
Resolution	0.01 m/s
Accuracy	from 0.1 m/s to 0.5 m/s reading ± 0.1 m/s at temperature 25 °C to 40 °C (77 °F to 104 °F) and humidity 50 % RH ± 15 % RH
General information	
Measurement interval	Via PC: Adjustable from 1 minute to 10 minutes
Storage temperature	-20 °C to 50 °C (-4 °F to 122 °F)
Operating temperature	10 °C to 40 °C (50 °F to 104 °F)
Dimensions (LxWxH)	27 cm x 20 cm x 14 cm (10.6 in x 7.8 in x 5.5 in)
Weight	3 kg (6.6 lb)

Included accessories

2206965 User Manual
2248900 Soft-sided Carrying Case
2239025 Airflow Sensor
2391761 Universal AC Battery Charger with Worldwide Mains Adapter Set
2391789 Serial Adapter DB-9M to DB-25F
2391789 Serial Cable DB9F to DB9F
2213928 Outside Temperature probe holder
2239002 Adapter for Radiant Infant Warmer Assembly
2213919 INCU PC Software (one CD)

Ordering information

2250148 INCU-UNIPOWER

$MAXO_2$+AE

Oxygen Analyzer

The $MAXO_2$+AE is an oxygen analyzer that measures the oxygen concentration in a flow of gas from a medical gas source or through a medical gas-flow device such as a ventilator or anesthesia system, or within an infant incubator. It is handheld and rugged to suit the needs of portable use. The $MAXO_2$+ AE comes equipped with a two-year warranty on both analyzer and sensor.

CE

Key features

- One-touch calibration, with reminder
- Long battery life (approximately 5,000 hours)
- Impact resistant and drip proof
- External MAX-250E Oxygen Sensor

Specifications

Measurement range	0 % to 100 %
Resolution	0.1 %
Accuracy and linearity	1 % of full scale at constant temperature, RH and pressure when calibrated at full scale
Total accuracy	± 3 % actual oxygen level over full operating range
Response time	90 % of final value in approx. 15 sec at 23 °C
Warm-up time	None required
Power supply	
Battery life	Approx. 5000 hours with continuous use
Low battery indication	"BAT" icon displayed on LCD
Sensor type	Maxtec® MAX-250E for AE model
Expected sensor life	> 900,000 02 % hours minimum, 2 years in typical medical applications
Power requirements	2, AA alkaline batteries
Environmental requirements	
Operating temperature	15 °C to 40 °C (59 °F to 104 °F)
Storage temperature	-15 °C to 50 °C (5 °F to 122 °F)
Atmospheric pressure	-800 mBar to 1013 mBar
Relative humidity	Operating range: 0 % to 95 % (non-condensing)
General information	
Dimensions (LxWxH)	38 mm x 76 mm x 914 mm (1.5 in x 3.0 in x 36.0 in)
Weight	285 g (0.6 lb)

Included accessories

User Manual
MAX-250 External Oxygen Sensor
Oxygen Sensor Cable
2448051 Breathing Circuit "tee"

Ordering information

2511920 $MAXO_2$+AE